Handbook of Finland

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A HANDBOOK OF FINLAND

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NAVAL STAFF
INTELLIGENCE DEPARTMENT

NOTE

This Handbook aims at giving an account of Finland up to the time of the outbreak of war in 1914, but wherever possible information has been revised to date. All statistics are pre-war figures.

The general map of Finland is based on the *Atlas de Finlande*, with additions from later Finnish, Russian, and other sources. The Admiralty will be glad to receive corrections and additions.

CONTENTS

FINLAND

MAPS OF FINLAND

So complex is the topography of the lake plateau, and so enormous the amount of detail, that the largest-scale map could scarcely do justice to it. The existing maps show only generalizations of the smaller details. With this reservation Finland is well mapped, and all aspects of Finnish geography have been carefully studied. A great deal of the work is due to the labours of the Geographical Society of Finland, whose main object is the study of Finland. Their periodical publication, *Fennia*, is an encyclopaedia of information on the country. In 1910 the Society published the second edition of an Atlas of Finland, with text in two volumes in French. In *Fennia* the articles are mainly in Swedish and German. The Swedish and Finnish articles often have German, French, or English summaries.

The following are the best maps :—

Karta öfver Storfustendomet Finland. Scale 1 : 400,000. In 30 sheets. Helsingfors, 1896–1906.

Kartasto Suomi (Pocket Atlas of Finland). Scale 1 : 400,000. With Lapland on a scale of 1 : 2,000,000. 1909.

Map of European Russia. Scale 1 : 420,000. Petrograd, 1913. In Russian, 17 sheets.

Suomen Kruununmetsäin Kartta (Forest map of Finland). Scale 1 : 800,000. In 4 sheets. Helsingfors, 1906.

Atlas de Finlande. Helsingfors, 1910.
A most valuable collection of maps on every aspect of the geography of Finland.

Finland, 1 : 1,500,000. Topog. Sect. Gen. Staff, War Office. 1906. Additions, 1916. An outline map, untrustworthy, and not revised to date as regards railways.

Europe, 1 : 1,000,000. (Provisional Edition.) Geog. Sect. Gen. Staff. 1916. Five sheets of this map cover Finland.

Finnish maps of certain small administrative areas on a scale of 1 : 100,000 are published.

Altitudes in Finnish maps are given in metres, and on Russian maps in British feet.

NOTE ON PLACE NAMES

Many places in Finland have both Swedish and Finnish names. One or other or both names are given on different maps. In this *Handbook* the Finnish form has been employed except in certain cases, principally towns, where the Swedish name is in common usage and the Finnish name little known. Names on or near the Scandinavian frontiers have a different form on Swedish and Norwegian maps. In many cases these forms have been given as alternatives to the Finnish form.

The following Finnish, Lapp, and other words commonly occur in place names in Finland :

älf (Swed.), river.
elv (Nor.), river.
harju (F.), ridge.
jaur (L.), lake.
järvi (F.), lake.
joki (L.), river.
kallio (F.), rock.
kanava (F.), canal.
kangas (F.), sandy plain.
kaupunki (F.), town.
koski (F.), rapid.
kylä (F.), village.
lahti (F.), gulf.
luokt (L.), bay.
luoto (F.), island.
mäki (F.), hill.
meri (F.), sea.
niemi (F.), cape.
nurmi (F.), pasture.
ö (Nor.) island.
pieni (F.), small.
saari (F.), island.
salmi (F.), strait.
selkä (F.), bay or gulf.
sjö (Nor.), lake.
suo (F.), marsh.
suolo (L.), island.
suuri (F.), large.
taipale (F.), portage.
träsk (L.), lake or swamp.
vaara (F.), mountain.
vesi (F.), water.

The letters *w* and *v* are interchangeable in Finnish.

CHAPTER I

GEOGRAPHICAL OUTLINES

Position, Extent, and Boundaries—Readjustment of Frontiers—Topographical Features—Geological Structure—Glaciation—Lakes—Rivers—Coastal Waters—Islands—Coasts.

Position, Extent, and Boundaries

Finland lies between Russia to the east, the Gulf of Bothnia and Sweden to the west, Norway to the north, and the Gulf of Finland and Russia to the south. All its sea-coast faces the Baltic, and Finland nowhere touches the Arctic Ocean, although it is separated, through Norway, by only twenty-one miles from Lyngen Fjord, and thirteen miles from Varanger Fjord. The extreme limits of the country are from lat. 59° 48′ N. to lat. 70° 6′ N., and long. 19° 2′ E. to long. 32° 50′ E. Its total area is 144,253 square miles. While in some cases the frontiers are marked by rivers, no pronounced physical features demarcate Finland from adjoining lands. The north of Finland includes a large part of Lapland, of which the rest is Russian and Norwegian. In the north-west Finland projects between Norway and Sweden into the Scandinavian highlands. Towards Sweden the Torneå river is the only boundary, while towards Russia the line is an arbitrary one, with no counterpart in physical features. It roughly coincides with the watershed between Baltic and White Sea drainage Half of Lake Ladoga belongs to Russia. The Finno-Russian boundary on the isthmus of Karelia winds across the plain, following certain small rivers for the greater part of the way. Finland includes the Åland archipelago and some isolated islands in the Gulf of Finland, Seitskär, Lavansaari, Hogland, Tytärsaari, and others.

The Gulfs of Bothnia and Finland are territorial waters, the first shared by Finland and Sweden, the second by Finland and Russia.

The delimitation of the frontiers is the result of various treaties, with alterations from time to time. The Finno-Swedish frontier was fixed by the treaty of Fredrikshamn in 1809, and the details decided in 1810. Off the north coast of the Gulf of Bothnia it runs east of the islands of Kataja, Stora Knifskär and Inakari, between Tirro and Sällön and between Selkakari and Björko to the Torneå river. The land frontier is 332 miles long and runs across the coast plains of the Baltic in the south, following the rivers Torneå, Muonio, and Känkämäeno. It then goes along the Kilpisjärvi to the frontier cairn of Koltapahta where Finland, Sweden, and Norway meet. This frontier region is described in more detail on pp. 128–130. The Finno-Norwegian frontier, 458 miles, was settled in 1751. From Koltapahta it traces a winding course along the watershed between the Arctic and Baltic drainage systems to the sources of the Skjetsamjokka. Then it follows the courses of the Inari and the Tana rivers to near Polmak. Thence onwards the frontier was long in dispute until adjusted in 1826. It follows a devious course across watersheds till it meets the Russo-Norwegian frontier at Mutkavaara near the Paatsjoki. The Finno-Russian frontier is 930 miles long. From Mutkavaara southward it is an arbitrary and undulating line delimited by the treaty of Stolbova in 1627. Farther south it is more sinuous and roughly conforms with the main watershed, but there seems to be some doubt as to its exact course. Across the isthmus of Karelia the frontier was fixed in 1816, with a small readjustment in 1864.

Readjustment of Frontiers

From 1917 onwards several suggestions have been made for a readjustment of the northern and eastern frontiers of Finland. Some of these suggestions originated in Norway; others are of Finnish, or probably German, origin, and one was said to come from Russia.

The proposals centre round the cession of Russian Karelia to Finland and the acquisition of a seaport on the Arctic

Ocean. These two ambitions are intimately connected, and extremists in Finland go so far as to claim all Karelia and the Kola Peninsula. There is no justification for this claim since Finns are not in the majority in the Kola Peninsula as they are in Russian Karelia. Moreover, no arrangement could possibly be acceptable to Russia which deprived her of the free use of the Murman Railway.

Other proposals include the cession of the Russian enclave of Boris Gleb to Norway, the acquisition of a Finnish port on Varanger Fjord or Pechenga Gulf and the cession of Enontekiö to Sweden or Norway.

In connexion with those suggestions it should be noted that in April 1918 the inhabitants of Boris Gleb petitioned the Russian Soviet Government in favour of the transference of that enclave to Norway, but the inhabitants of the Pechenga district, who are a few Russians, show no desire to pass under Finnish sovereignty.

Finland has an historical right to an Arctic port in virtue of the Russian decree of 1864, by which Finland ceded Sestroryetsk and adjoining lands in the south-east on condition that she got compensation in the far north. Russia never fulfilled her part of this promise, and therefore has obligations towards Finland. Norway, on the other hand, has no reason to favour the Finnish ambition for a part on Varanger Fjord which cannot be supported on historical, economic or racial grounds. From the Finnish point of view no alterations in the frontier would be acceptable that do not give Finland a good route to the sea and a favourable port on the Arctic Ocean. These requirements were met by a proposed agreement between Russia and Finland in March 1918. According to this agreement Russia was to cede to Finland all her territory west of a line drawn from Korvatunturi, on the Finno-Russian frontier, in about lat. 68° N., to Zubovskaya Bay on the north coast of the Ribachi Peninsula, the frontier to curve through the middle of the Sredni Peninsula. Russia in return was to have compensation in the south-east of Finland. The adoption of this frontier would

give Finland a satisfactory deep-water harbour on Pechenga Gulf, which is fairly accessible from Lapland and northern Finland. The negotiations broke down, however, before any settlement was reached.

Topographical Features

Finland is essentially a land of plains, lakes, swamps, and forests, and, although geographically merging into Russia, Norway, and Sweden, has characteristic features of its own, especially in the southern and western parts. The distinctive features of its physiography and population give it a unity and national life which its intermediate position between two strong powers, Russia and Sweden, to east and west, has served only to accentuate. The political geography of Finland is the outcome of its position just as its human geography is the result of its peculiar physical circumstances. Finland is known to the Finns as Suomi.

Finland consists of a great plateau fringed with lowlands towards the sea. The general surface of the plateau has an elevation of about 300 ft. in the south and about 500 ft. in the north. There are no mountain chains properly so-called, but there are some isolated peaks in the north. The general surface is more or less level, with a gentle slope down from the interior to the coast. There are, however, many little inequalities, low rocky hills, ridges of moraine matter, and depressions filled by lakes.

The interior of the southern half of Finland is occupied by the lake plateau, on which are many thousand lakes. So strewn with lakes is this plateau that in most parts water is more frequent than dry land. The many arms and branches of the irregularly-shaped lakes cut the land into peninsulas, isthmuses, and islands. The general lie of the lakes is north-west and south-east, but they do not all conform to this arrangement. These lakes are not deep—under 10 fathoms in most cases—if exception be made of the immense Lake Ladoga in the south-east, which is a lake of a different origin and aspect from the others. The altitudes of the lake surfaces

vary from 266 ft. (Lake Saima) to 312 ft. (Näsijärvi). The hills on the lake plateau are rarely over 350 ft. in height and often less. To the north and north-east the lake plateau is more elevated than in the west. North of Pielisjärvi the mean level rises to over 500 ft. with a corresponding rise in the surface level of the lakes, and there are many peaks rising to 1,000 ft. or more. Where Finland is narrowest, in the latitude of the head of the Gulf of Finland, the lake plateau reaches over 1,000 ft., its greatest height.

Northern like southern Finland is a plateau, but it is much more elevated. Heights are comparatively numerous, and there are few lakes. There are several mountains in the east and north-west; the south-west part, on the other hand, is more uniform, and is scored by several rivers, including the Kemijoki, the Ounasjoki, and the Tornionjoki, which are the largest rivers of Finland. Between Norway and Sweden there is a wedge of Finland extending north-westward towards the Atlantic. This part of Lapland, called Enontekiö, is the most elevated part of Finland, and belongs geographically to Scandinavia. Off the Finnish end of Enontekiö are many heights, among which Outtakka rises to 2,502 ft. The average altitude of Enontekiö is 1,800 ft., and nowhere is it under 1,300 ft. There are several heights over 3,000 ft., of which Halditsjokko (4,439 ft.), on the Norwegian frontier, is the highest point in Finland. The large Lake Inari (374 ft.) occupies a considerable area in the extreme north-east of Finnish Lapland, and, together with the adjoining regions, drains through Norway and Russia to the Arctic Ocean.

The lake plateau of the south has a fringe of lowlands towards the Gulfs of Bothnia and Finland, and Lake Ladoga. The slope is gentle from the sea to the lake plateau; it is steepest to the north-west of Lake Ladoga. To the south-west of Lake Ladoga the lowland fringe of Finland stretches to the plains of the Neva by the broad isthmus of Karelia. The plains continue round the western side of the lake. The greatest altitudes in the isthmus of Karelia are about 600 ft. on the frontier.

The plains of Finland are mainly clay and very uniform. The rocky heights that occur in places, due to outcrops of the underlying rocks, are all low even if locally prominent. Streams from the interior score the plains with many shallow valleys. Lakes are rare except in the isthmus of Karelia, and in the south-west corner of Finland. Their surface levels vary from 60 to 145 ft., and none of them is as extensive as the large lakes of the plateau. The most prominent features are the sandy and stony ridges, lying generally north-west and south-east, but sometimes south-west and north-east. These ridges of moraine matter (see p. 17) sometimes attain a height of 200 ft. above the plain. The low rounded protuberances of rock which form the coast hills are most numerous in the south-west and least in the south. They appear in the shallow sea off the coast as low islands. The moraine ridge of Salpausselkä bounds the lake plateau on the south. Along the Gulf of Bothnia the nature of the coast plains changes. The shores become lower, the plains more level, coastal hills decrease in height, and islands disappear. In Österbotten there are many small rocky hills, but they are seldom over 40 ft. in height, and as a rule scarcely exceed the general level of the plains. There is one isolated height of about 426 ft. between the valleys of the Kyrönjoki and Lapuanjoki, called Simsiönvuori. Lastly, in these western plains the slope to the plateau is more gentle than in the south. It is only near Kemi in the north that the interior heights come near the coast, and the gradient is steep. These plains are continued in Swedish territory on the west of the Gulf of Bothnia.

Geological Structure

Finland, like northern Scandinavia, and the Kola Peninsula of Russia, is a plateau of hard crystalline rocks, granite, gneiss, and schist. Over these underlying rocks is spread a covering of sand and clay left by the ice of the glacial period. This layer of Quaternary deposits is generally thin, and patches of the ancient rocks below are often left exposed.

Only in the isthmus of Karelia and on some of the islands in the head of the Gulf of Finland are the Archaean rocks completely hidden by deep deposits of Quaternary age. There are scarcely any rocks in Finland of ages between Archaean and Quaternary. The mountains of Lapland are granitic, and the hills on the coast plains are due to elevations on the underlying granite surface projecting through the covering of glacial matter. Where the underlying rock surface is fairly level, rocky coastal hills are absent, as along the plains of the Gulf of Bothnia.

Glaciation

The glacial deposits of the interior consist of stony moraine matter; those of the coast regions mainly of clay. The clays, formed of fine glacial mud, were either carried out to sea, deposited on the sea floor, and subsequently elevated, or were laid down in the beds of rivers draining from the ice-cap of the interior during the retreat of the glacial conditions. Many of these deposits show alternate layers of sand and clay. The sand was laid down during the summer floods of the glacier streams, and the mud by the gentle current of autumn, the low velocity of which would not enable it to carry the heavier sand. The coarser matter on the lake plateau was derived from ground moraines

Both on the lake plateau and in the coast regions there are many long ridges of sand and pebbles (p. 16). Such a ridge was originally called an *ås* (pl. *åsar*), a name which from the pronunciation has evolved to the modern form ose (oses).

The oses are very frequent in the south and south-east, but rarer in the north. They generally lie north-west and south-east, but sometimes north and south, or north-east and south-west. In fact their general direction is that of the ice which once covered Finland, and to which they owe their origin, being the remains of marginal moraines. The most prominent oses, however, run roughly east and west in the south of the country. These are old terminal moraines, and mark the ends of the ice sheet during its retreat. The longest is called the ose of Lohja and of Salpausselkä, and runs from Hangö, on

the coast, to Lahti, then east by Lappeenranta, till it curves away to the north-east to Värtsilä. From Lahti to Värtsilä it marks approximately the junction of the lake plateau with the coast plain. A second great ose lies on the plateau 9 to 15 miles north of the last, and roughly parallel with it, running northward to Joensuu. Sands sometimes mark the courses of these oses instead of the coarse gravels which are habitual. The ground of the oses is dry but infertile, and of little use for agriculture. They form, however, convenient natural embankments for roads and railways, with a good supply of road metal and ballast at hand.

The explanation of the peculiar topography of Finland rests on its being a land that was heavily glaciated in the past. While its underlying rocks date from the earliest geological epoch, Finland, as regards its superficial rocks, is almost the youngest country in Europe. It is these recent deposits which are responsible for the present surface features. At the end of the glacial period much of Finland was below the sea, and then were deposited many of the clays now found on the coastal plain. The interior of the country was above sea-level, and as the glaciers slowly melted and receded, lakes became more numerous. The gentle slope of the plateau gave the rivers a slow current and little power of erosion, and so the water was held up by banks of moraine matter above the level of the rock-basins. The principal cause of the many lakes, then, is the result of unequal erosion of the rocky floor of Finland, but in many cases the basins have been increased in height by glacial deposits, and rivers have been dammed by *åsar*.

Erosion by the ice sheet accounts also for the low rounded hills and rocky protuberances of the coastal plains, and the smoothed contours of the outlying islands, reefs, and skerries. The land has been rising slowly ever since the post-glacial period of depression. As it rose the submerged hills and ridges of the former plains appeared as islands off the coast, while the old valleys remained drowned as land-locked channels and long inlets on the coast. This gradual elevation is still proceeding.

Lakes

The part that water plays in the surface features of Finland is the most notable aspect of its topography, and one that finds its reflection throughout the social organization and characteristics of the people. The differentiation between rivers and lakes is not always easy. The lakes in many cases may be considered as wider stretches on the long water-courses which traverse the plateau in all directions. Many of the lakes are in festoons, linked one to another by short channels, or longer river courses, affording continuous waterways between the far interior and the sea. As has been shown, the southern part of the plateau, called the lake plateau, bears most of the lakes. The majority are between lat. 61° 30′ N. and lat. 67° N., but in few parts of Finland, except the coastal plains, is the surface for any great distance uninterrupted by sheets of water. There are said to be upwards of 35,500 lakes, great and small, in Finland, and their combined area is 11·73 per cent. of the total area of the country. Of course the percentage of the lake plateau covered with water is higher—about 22 per cent.; in some parishes over 50 per cent. of the superficial area is water. Some of the lakes are distinct from one another except for the streams which join them; others are really landlocked gulfs of larger lakes. The general direction of the longer axes of the lakes is north-west and south-east, which was the direction of the line of flow of the ice-sheet during the glacial period. The great terminal moraines, or *åsar*, of Salpausselkä and Lohja (p. 17), bar the inland waters in the south of the lake plateau, and tend to elongate the lakes in an east-and-west direction.

The lakes seem at first sight to lie in confusion over the surface of the country, but nevertheless they can be grouped into certain hydrographic systems or basins, which are best marked in the lake plateau in the south. These may be termed the south-west, the central, and the south-east systems, and named, after the central lake in each and the river which drains from it to the sea, the **Pyhäjärvi-Kokem-**

äenjoki, the **Päijänne-Kyminjoki,** and the **Saima-Vuoksi.** In the northern part of the lake plateau the **Oulujärvi-Oulunjoki** forms a definite hydrographic system. In Lapland the lakes are more scattered and cannot be grouped in the same way, for the rivers are more noticeable than the lakes, which suggest merely flooded stretches of the river valleys. In the extreme north of Lapland, however, **Inarijärvi,** or **Inari,** forms a definite hydrographic centre.

Arranged according to this grouping, the largest lakes are given in the following list, with their approximate areas in square miles, but it must not be assumed that lakes in the same group are necessarily linked by water-ways. The through communications are given in Chapter X Among the lakes of Finland there is some repetition and much similarity in names. Pyhäjärvi is applied to many large and small lakes.

	Area sq. miles
Pyhäjärvi–Kokemäenjoki, or South-west System	
Näsijärvi	106
Längelmävesi	83
Pyhäjärvi	63
Kyrösjärvi	45
Keurenselkä	44
Päijänne–Kyminjoki, or Central System	
Päijänne	429
Keitele	186
Puulavesi	155
Konnivesi	77
Nilakkavesi	73
Kivijärvi (Vasa)	69
Suontienjärvi	62
Kyyvesi	61
Pielavesi	57
Joutsenjärvi	57
Vesijärvi	43
Kolimajärvi	41
Saima–Vuoksi, or South-east System	
Saima	502
Pielisjärvi	364
Orivesi	289
Puruvesi	223
Kallavesi	218
Haukivesi	200

Höytiäinen	111
Juojärvi	110
Pyhäjärvi	105
Pyhäselkä	96
Suvasvesi	96
Viinijärvi	60
Juurusvesi	59
Luoterivesi	55
Onkivesi	49
Kivijärvi	47
Unnukka	39

Other large lakes, including the lakes of Lapland, are more or less independent of any of these three systems. Of the solitary lakes Ladoga is by far the largest, with an area of 7,000 square miles, of which 3,100 are in Finland. The most important of the other solitary lakes are :

	Area sq. miles
Jänisjärvi, near Ladoga	78
Koitere, in Karelia	66
Lappajärvi, in Österbotten	55
Oulujärvi, in the north of the lake plateau	387
Ylititkajärvi, in Lapland	82
Kemijärvi, in Lapland	55
Kiantajärvi, in Lapland	53
Inari, in Lapland	534

All the large and many of the smaller lakes have been sounded, and this work has disposed of the popular belief, current throughout Finland, that they are of great depths or ' bottomless '. In fact most of them comparatively shallow. Of 370 lakes on the plateau which have been sounded only 34 have a depth of over 10 fathoms, and only eleven, including Ladoga, are over 27 fathoms. These are Kyrösjärvi, Puulavesi, Keitele, Näsijärvi, Lojo, Saima, Haukivesi, Vesijärvi, Päijänne, Paanajärvi and Ladoga. The deepest lakes are Päijänne, 61 fathoms, Paanajärvi, 70 fathoms, and Ladoga. The depths in Lake Ladoga are very unequal : the Russian half is shallow compared with the Finnish half, which reaches a depth of 142 fathoms. The mean level of Ladoga is 55 ft. above sea-level but it rises and falls 7 ft. according to atmospheric conditions.

The shore-line of the lakes is generally very irregular, particularly in the larger ones, and there are innumerable sheltered

inlets and anchorages. The banks are low and often swampy. Only a few lakes, as Tarjänne and Ruonanjärvi, have steep banks, with the exception of the mountain lakes in Lapland. Most of the large lakes are studded with low islands, but a few, like Päijänne and Orivesi are comparatively clear. Rocks and reefs are frequent. The north-west coast of Ladoga is rocky and much indented, and fringed with many small islands; the south-east coast is lower, has long sweeping curves, few inlets and no islands.

The level of the lake waters varies somewhat during the course of the year. Generally speaking, in May and June the waters are highest, as a result of the melting snow and the release of waters from thawing tributaries. In summer there is a fall in level, for evaporation is great in the wide-spread shallow lakes. In early autumn the rains cause another rise, which is checked by winter. Early frosts stop some of the tributaries, and from north to south winter comes on apace. By November most of the lakes are frozen, but the larger southern lakes, Päijänne and Saima, are open till the middle of December. For two or three weeks after the surface waters freeze the ice increases in thickness about half an inch a day. The ice is thickest by the end of March; on Kuhankavesi and Jyväsjärvi it has been found to be about 15 ft. thick at that season. About May 10, the lakes in the south-west and south, and in western Österbotten, begin to break up. Ten days later the ice on all lakes as far north as the head of the Gulf of Bothnia is in motion, except in the north-east of the country. Oulujärvi breaks up about May 24. By the end of May the break-up has extended throughout Lapland, except in the extreme north, where Lake Inari and the lakes of Enontekiö break up by the middle of June. Of course there is much floating ice for several days after these dates, and navigation cannot safely begin until it has been carried away by the rivers, or melted.

The lakes of Österbotten break up somewhat earlier than those in the east, because Österbotten has a less severe winter climate and the ice is therefore not so thick. Moreover

a thinner covering of snow melts more quickly than the deeper layer of the interior and thus exposes the ice sooner to the sun's action. In early springs the southern lakes begin to break up a month earlier, and the northern ones about a fortnight earlier, than usual.

Ladoga begins to freeze in October, but the deeper parts are open till December. In the middle it begins to break up in April, but there is floating pack-ice for several weeks later. The ice on Ladoga seldom exceeds 4 ft. in thickness, but ridges of pack may be 50 ft. thick or more.

In summer the surface temperature of the southern lakes reaches 60° F. to 75° F., but in Ladoga, even in August, it barely reaches 53° F.

Rivers

The lakes of Finland, most of which are linked into chains, all drain to the sea, but there are few long rivers except in Lapland, unless the lakes are regarded as expanded portions of the river beds. On the other hand there are many small rivers. They are not only more numerous on the coastal plains than on the plateau, but also more conspicuous in the comparative absence of lakes. On the plateau, and to some extent on the coastal plains, the rivers show no decided direction of flow. The low gradient of the plateau and the irregular deposition of moraine matter have caused them to wind in all directions. Their courses might almost be called accidental, for they are as likely to flow in one direction as in another, sometimes in rocky channels, sometimes sluggishly over wide plains, and often losing themselves in broad lakes. The watersheds are low and very indistinct: in many parts of the lake plateau they vary from season to season and year to year.

Almost all the drainage of Finland reaches the Baltic, the Gulf of Finland, and Lake Ladoga. Only a small part, from Lapland, drains through Norway and Russia to the Atlantic and Arctic Oceans, and a still smaller amount through Russian Karelia to the White Sea. The waters that drain from

Finland into Lake Ladoga ultimately find their way by the Neva through Russian territory to the Gulf of Finland.

More than half the drainage of Finland reaches the sea by seven rivers. These rivers with the areas of their drainage basins are as follows from north to south and east:—The Tornionjoki, with the Muonionjoki, forming the Finno-Swedish frontier, 5,400 square miles; the Kemijoki, 20,400 square miles; the Iijoki, 3,800 square miles; the Oulunjoki, 8,900 square miles, all flowing into the mouth of the Gulf of Bothnia; the Kokemaënjoki (Kumo), 13,510 square miles, flowing to the south of the Gulf of Bothnia; the Kyminjoki, 14,300 square miles, to the Gulf of Finland; and the Vuoksi, 2,300 square miles (in Finland) to Lake Ladoga. Among the smaller rivers the most important are the Siikajoki, the Pyhäjoki, the Kalajoki, the Lapuanjoki, and the Kyrönjoki. The basin of Lake Inari in the north of Finnish Lapland (4,600 square miles) drains by the Paatsjoki or Pasvikelv and other rivers to the Arctic Ocean. Lakes occupy 10 to 20 per cent. of the drainage areas of all the rivers within Finland. The most important river draining to the north is the **Tenojoki** or **Tanaelv,** which, with certain of its tributaries, forms a long stretch of the Finno-Norwegian frontier. The **Uutuanjoki** or **Munkelv** flows from the north-east of Lake Inari to Kjö Fjord. It is only 21 miles long, and less than half its length is in Norway. The river is shallow and has at least one short fall, but small boats can navigate it from end to end.

On the plateau the rivers frequently have rapids. Those that flow to the coastal plains have a steep gradient over the edge of the plateau and a series of rapids and falls which, in most rivers, continue as far as the sea. A total of 1,442 rapids has been mapped and named on the Finnish rivers, but the list is incomplete for northern Finland and Lapland. These rapids seriously interfere with navigation, but on the other hand they provide abundant water power (see p. 113). The short stretches of the rivers between the lakes rarely have rapids, although the current is often strong.

The southern rivers freeze early in December in the calm

stretches; the northern a few weeks earlier. They break up in May. The Tornionjoki freezes about November and breaks up again in May. The rapids keep open later and their freezing results from ice-blocks, formed in the bottom and along the banks, collecting and becoming jambed in the narrow channel. These freeze together, and though the water continues to flow below, the rapid is bridged. Peasants sometimes bridge the rapids with ice-blocks from the banks while the current is still running strong and open. The level of the rivers generally falls a little during the first three months of the year. In the south the waters begin to rise about mid April, and in the north two or three weeks later. There is a second rise in October, November, or even in mid December. In August the waters are lowest. Despite the difficulties they offer to navigation, the rivers of Finland are of considerable importance in the economic life of the country.

The **Kyminjoki,** which formed the frontier between Finland and Russia from 1743 to 1809, is one of the most important rivers, and in most respects, though larger than any others in the south, it may be taken as typical of the rivers of Finland. It flows from the south-eastern end of Lake Päijänne in a general south-south-east direction to the Gulf of Finland at Kotka. The total length is 113 to 124 miles, according to the branch of the lower river which is followed. The course is very devious. At 105 miles from Lake Päijänne it divides into two main branches, of which the eastern runs direct to the sea and is about eight miles long; the other takes a winding course through Tammijärvi and divides into several branches which enter the sea 12 to 20 miles due west of the other branch. There is no real delta, but there are many deposits of moraine matter near the mouth. The Kyminjoki passes through many large and small lakes, in which there are numerous small rocky islands, but in the intervening stretches of river there are few islands. The banks are high and rocky in the upper part of its course except in the lakes, and as high as 100 ft. at the rapids of Mankala. As far as Kuusankoski, about 12 miles below

Pyhäjärvi, the banks are only 1½ ft. to 20 ft. high except at Voikka rapids where they rise to 80 ft. From Kuusankoski to the railway bridge at Koria they are 40 to 120 ft. high, and abrupt. Thence to Anjala they are less than 20 ft., but at the rapids of Anjala they rise to 80 ft. From Anjala to the sea the banks are low and liable to inundations, which never occur higher up. This alternation of high and low banks is typical of all Finnish rivers. The banks at the rapids are generally high and on the coastal plain low. The Kyminjoki has 45 rapids and a total fall from source to sea of 236 ft. Most are on its lower course.

The width of the Kyminjoki varies from 80 to 200 ft. in the rapids to 300 to 1,100 ft. in the quieter stretches. In the lakes of course it is much wider. The depth of the river is variable from its lake source to the sea. In the rapids it is shoalest, 6 to 10 ft., while the deepest parts are directly below the rapids and are due to the erosive power of the stream at those points. Below the rapid of Susikoski the depth is 85 ft., which is about 16 ft. below sea-level. In other parts of the river the depth is 10 to 50 ft., and over 130 ft. in some of the lakes. In the branches near the sea the force of the stream at the foot of rapids in places has eroded the soft rocks of the plains to 5 to 15 ft. below sea-level. The tributaries are few and unimportant. All these features are characteristic of Finnish rivers generally.

The utilization of the rivers for navigation is considered in Chapter X and for water-power in Chapter VII.

Coastal Waters

So indented is the coast-line of Finland that while the direct distance by sea from the head of the Gulf of Bothnia to the head of the Gulf of Finland is barely 1,000 miles, the total length when all the indentations are taken into account is over 3,000 miles. On the northern part of the west coast and on some stretches on the east of the south coast there are comparatively few islands, but elsewhere they are numerous, particularly, first, off the North Quarken in the

Gulf of Finland, and secondly at the South Quarken in the south-west corner of Finland.

The North Quarken is the narrowest part of the Gulf of Bothnia, the distance being 41 miles from the Finnish mainland to the Löfö Peninsula in Sweden. An archipelago projects westward from the Finnish side, and the remaining width of the gulf is obstructed by a group of islands in Swedish waters cutting the Quarken into the East and West Quarken. The East Quarken, which is Finnish, is narrow at the south and wider at the north; in the West, or Swedish, Quarken the dimensions are reversed (see *Baltic Pilot*, iii).

In the south-west of Finland the coast-line has a general north-west and south-east direction and is indented by many long inlets. Off this corner lie most of the islands of Finland. The islands extend almost across to the shores of Sweden. They are not everywhere so closely placed as to interfere with navigation, but it is only on the extreme west that there is a free and open channel, via the Åland Sea, from the Baltic to the Gulf of Bothnia. In its widest part between the westernmost Finnish island and Sweden this passage is about 20 miles across, but the southern entrance between Söderarm (to Sweden) and Lågskär (to Finland) is constricted by off-lying shoals to about 10 miles, while the northern end of the passage, called the South Quarken, is constricted to about 6 miles. Off the southern entrance, about 25 miles to the south-east, is the Finnish lighthouse of Bogskär, indicating a group of rocks, most of them sunken. Entrance to the Åland Sea should be made from the south-east, as there is foul water many miles due south of the entrance.

Islands

The eastern part of the Finnish archipelago is called the Åbo archipelago, and the western and rather more detached part the Åland archipelago. The boundary between the two is more or less arbitrary, but the wide channel of the Stora Skiftet is looked upon as the division. Near the mainland the Finnish archipelago has largely the character of the main-

land, but farther towards the west more distinctive features appear; the islands become fewer in number and the sea, in large channels and wide bays, becomes more and more evident.

The **Åbo archipelago** consists of several large islands to the west and south of Åbo, and countless small ones farther away. A noticeable feature is that the large islands are all close together and that the channels which separate them are narrow, relatively deep and free from islands and rocks. The largest island in the Åbo archipelago is Kimitö, cut off from the mainland by two converging narrow channels which lead far into the south-west of the mainland till they join at the mouth of the Uskelanjoki. In general, the larger islands of this archipelago are arranged in series which suggest their origin in drowned peninsulas of which the original transverse valleys are now channels of the sea. Between these lines of larger islands lie great gulfs studded with small islands and rocks. The larger islands near the mainland have an average elevation of 60 to 100 ft.; the smaller islands are lower. Most of the islands, large and small, are abrupt and rocky, and are covered with forests. The south of the archipelago is most difficult to navigate because of the enormous number of rocks, most of them below water. There are nevertheless several good deep-water channels leading to the land (see *Baltic Pilot*, Part iii). On the Kimitö River, as the channel on the east side of Kimitö Island is called, is the short Kimitö canal, 12 ft. deep. Great parts of the archipelago are not accurately surveyed and complete reliance cannot be placed on the chart. Local knowledge is absolutely necessary, and pilots should always be employed. Russian naval officers have made a close study of the waters of parts of the Åbo and Åland archipelagos for the use of the Russian fleet, and it is maintained that the largest battleships can pass by secretly charted channels.

The **Åland archipelago,** centring round the large island of Aland, forms a sort of bridge or stepping-stones across the Gulf of Bothnia between Sweden and Finland. For con-

venience of reference all information about the Åland archipelago is grouped together in Chapter XI.

The origin of these peculiar archipelagos is probably to be found in glacial action working on a fractured or faulted plain. The faults determined the lines of the present channels and the outlines of the islands, while ice action excavated irregularly the intervening surface. The land was then submerged and is now undergoing a slow elevation (see p. 18).

Several outlying islands in the eastern end of the Gulf of Finland belong to Finland. Most of them are small and of no importance except in so far as they are a menace to navigation.

Stenskär (lat. 59° 49′ N., long. 26° 23′ E.) is a bold rocky island with a long reef projecting about two miles south by east, and about half a mile north. It has a lighthouse and a telephone to Reval via Ekholm lighthouse. Stenskär is Russian territory. All the other islands mentioned, with the exception of Kotlina, are Finnish.

Rodsher, 13 miles north-east of Stenskär, is a small rocky island surrounded by a reef. It is uninhabited.

Hogland or **Suursaari** is six miles long from north to south with a greatest width of 1¾ miles. There are four hills on the island, of which the southernmost (525 ft.) is the highest. The southern end is 10 miles 76° E. (true) from Rodsher. The island bears a good deal of timber, and there are two villages on the eastern side. The people are of Swedish descent, but speak Finnish. The allied Esthonian, of the Baltic province of Russia, is understood. There are lights on the north and south ends, a pilot station, and a telegraph cable to Kounda on the Russian side of the Gulf of Finland. The anchorages are bad, but there is holding ground in deep water on both sides.

The **West** and **East Tyters** (**Tytärsaari**) lie respectively 12 and 10 miles south of Hogland in Finnish waters. The West or Little Tyters is 2½ miles long, low and sandy, and has some fishermen's huts, temporarily inhabited. It is surrounded by shoals with rocks on the south-west. East or Great Tyters

lies 8 miles east-north-east of Little Tyters. It is high and thickly wooded, and has a village on the south side. There is a light on the summit.

Sommars Island (Sommarö) is 21 miles 73° E. (true) from the north end of Hogland. It is small and rocky, 50 ft. high and surrounded by reefs. There is a lighthouse on the west.

Lavansaari is a large irregularly-shaped island 23 miles east of Hogland. It is 3½ miles from north to south and 3 miles across, moderately high and wooded. There is a village on the bay called Malmiget-Lacht on the north, with telephonic communication with Narva.

Penisaari is 3¼ miles east of Lavansaari, and is about 2 miles long, west-north-west and east-south-east, low and narrow. There are no permanent inhabitants.

Seitskär (Seskär) is 9 miles east of Penisaari. It is about 2½ miles long from north to south and a mile broad, low and densely wooded. There are several villages on the west side and an 8-ft. channel dredged up to Seitskär harbour. From the lighthouse on the north-west end there is a telephone to Narva.

Kotlina Island lies in the mouth of Neva Bay in Russian waters. Despite its small extent, 6 miles long by one broad, it is by far the most important island in the Gulf of Finland, because on its eastern end is Kronstadt, which was once the strongest fortress in Russia and is now one of her greatest commercial ports.

Valamo Island, which lies in the Finnish part of Lake Ladoga, has a monastery with about 500 Russian monks. It is a great resort of pilgrims in July, when as many as 3,000 come in a day. The island is 8 miles long by 4 miles wide and is entirely under the control of the monks. The monastery was founded in 992.

Coasts

The coasts of Finland are for the most part low, rocky, and generally barren. The land-locked channels among the islands near the shore tend to become silted up with matter brought

down by the many turbid rivers. The result is that in many places it is difficult to say where the land ends and the islands begin.

The northern shores of the Gulf of Bothnia show certain peculiarities. They are comparatively clear of islands, and they are as a rule very low-lying and often backed with sand-dunes. These are most frequent in the Uleåborg district, and seem to be formed by the combined action of rivers, sea, and wind. The rivers bring down great quantities of sand, which is deposited in the estuaries. The sand is carried back on to the land by high water, the result of onshore winds, and there it dries and is driven into dunes by the subsequent action of the wind. Thus the dunes are most frequent in the neighbourhood of large rivers, being generally situated to the south of the estuary because strong northerly winds are frequent. Some of these dunes shift as much as 18 to 20 ft. a year, and engulf meadows and even woods. Old dunes are to be found six or even twelve miles or more from the coast, but as they move inland their rate of progress gradually decreases. Vegetation gets a hold on them, and by covering them stops their movements. Karlö Island, off the mouth of the Oulunjoki river, is built of river-borne waste and is crossed by several dunes. The formation of these sand-dunes is closely linked with the formation of deltas, which are common on the rivers of the northern coast of Finland.

The only other coasts of Finland that are as low as these, in the Gulf of Bothnia, are the coasts of the isthmus of Karelia from the Russian frontier to Petrograd. There the coast is low and backed by swampy land.

The west coast of Finland from the Torneå river to Åbo has been surveyed and sounded by the Finnish Government, and the south coast by the Russian Hydrographic Department. Both west and south coasts are well charted, with the exception of the northern parts of the Åland Islands and the outlying parts of the Åbo archipelago. There are many lighthouses and beacons (see *Baltic Pilot*, iii) and the pilotage system is well organized. In 1910 a proposal to transfer the

Finnish Pilot Department to the Russian Admiralty failed, because the heads of the Russian Navy declined to take responsibility for accidents if this were done, but by January 1912 the opposition seems to have been overcome and the Admiralty at Petrograd became responsible for the pilot service of Finland.

An order was issued shortly before the outbreak of the war to the effect that the names of all Finnish light-ships and pilot craft were to be painted in Russian characters.

CHAPTER II

THE BALTIC SEA

General Features—Extent and Depths—Shores—Circulation—Ice—Opening and Closing of Ports

General Features

The Baltic is a long narrow arm of the North Sea which extends far into the heart of northern Europe. It brings regions otherwise almost inaccessible into touch with the Atlantic and the countries of western Europe. It is the chief line of approach to Sweden and Russia, and the sole one to Finland. The greater part of Germany's coastline is towards the Baltic. All the life and trade of northern Europe centre round it, and the great cities of northern Europe stand on its shores. It is, and always has been, the great civilizing factor in northern Europe, and in many respects is to the north what the Mediterranean is to the south, although it could never bring to the lands it washes all the advantages of the Mediterranean. In the first place, the Baltic had the drawback of being the road to nowhere and ending in undeveloped and uncivilized lands, and in the second place its high northern latitude results not only in the sea itself being frozen for several months, but in prevalence of climatic influences adverse to human settlement and progress along its shores. Lastly, its narrow entrance from the North Sea is impeded by the islands of the Danish archipelago. The channels are deep enough to allow any vessel to pass, even if two of them at least are difficult to navigate; but they are easily held, and the country that commands the Belts and the Sound can control the traffic to and from the Baltic. Another drawback arising from the narrowness of the entrance is that the tidal wave from the ocean is impeded, with the result that

the Baltic is practically tideless. This facilitates its freezing, which interferes with navigation for as much as six months in some parts (see pp. 36–42).

Extent and Depths

The Baltic is known to the Swedes as the *Östersjö*, to the Danes as the *Østerø*, to the Germans as the *Ostsee*, to the Russians as the *Baltiskoe More*, and to the Finns as *Itämeri*. It communicates with the North Sea by three channels through the Danish archipelago, the Great Belt, the Little Belt, and the Sound. The Great Belt is the best for large ships. It has a 6-fathom channel, but requires careful navigation. The Little Belt has a 6-fathom channel, narrow and tortuous. The Sound is most direct, but cannot be used for vessels drawing over 23 ft. The Kiel Canal was constructed as an alternative outlet entirely within German territory.

The Baltic has two branches, the Gulf of Bothnia to the north, 360 miles long, and the Gulf of Finland to the east, 240 miles long. Between the Baltic and the Gulf of Bothnia, to the west of the Åland Islands is the Åland Sea, generally included with the Gulf of Bothnia. The Gulf of Bothnia is known to the Swedes as the *Bottniska Viken* and to the Finns as *Pohjanlahti*. Occasionally it is subdivided into the Bothnia Sea (Swed. *Bottenhafvet*, Finn. *Selkämeri*), between the South Quarken and the North Quarken, and the restricted Gulf of Bothnia (Swed. *Bottenviken*, Finn. *Perämeri*), to the north of the North Quarken.

The submarine plateau, on which lie the islands of the Danish archipelago, and its eastward extension towards Bornholm forms the real division between the Baltic and the North Sea. East of Bornholm the Baltic is generally shallow, but has a number of comparatively deep holes. The Bornholm hollow lies immediately east of the island of that name, and is separated by shallow water extending from Öland to the west of the Gulf of Dantzig, from the Dantzig hollow lying off the gulf, and the Gotland hollow between Gotland and

Courland. Between Gotland and Öland a deep channel runs northward along the coast of Sweden and meets the deep channel from the Gotland hollow. In the north of the Öland channel, 17 miles east of Landsort is the deepest sounding in the Baltic, 240 fms. The Gulf of Finland is shallow, being scarcely over 50 fms. The Gulf of Bothnia is cut off from the Baltic by a more or less definite sill with 40 to 50 fms. of water, running from the south of the Åbo archipelago westward to the coast of Sweden in about lat. 59° 40′ N. The Åbo archipelago and the Åland Islands rise from a shallow platform under 25 fms. deep; but the Åland Sea is over 110 fms. deep in its northern part, which communicates by a narrow 30 fms. channel through the shallow water of the South Quarken with the deeper waters to the north. The deepest part of the Gulf of Bothnia is about lat. 63° N., not far from the Swedish coast, where there is a hollow over 200 fms. deep. The North Quarken, where the gulf is restricted, is underlain by a sill at 10 to 20 fms. and the gulf deepens again as it widens in the north, but the head is everywhere shallow. Throughout the Baltic the deepest water is near the Swedish coast.

Shores

The shores of the Baltic are generally low. Along the south the coasts are low and sandy, backed by sand-dunes and many freshwater lakes or *haffs*. The coast of the southern part of the Swedish peninsula is moderately high, but not rocky. On the other hand the shores of the Gulfs of Finland and Bothnia, especially around their entrances, are rocky, but rarely over 50 to 60 ft. in height. The Finnish islands in the Baltic are considered in Chapter I.

The drainage area of the Baltic is great, for it includes the basins of the Neva and the Vistula; it has been estimated to be over 600,000 sq. miles.

Circulation

The abundance of fresh water, together with the low evaporation and restricted connexion with the North Sea, results

in the waters of the Baltic being of low salinity, especially on the surface. While North Sea water has a salinity of about 34 to 35 per 1,000, that of the Baltic has 30 per 1,000 or less. In some of the shallow parts towards the heads of the Gulfs of Finland and Bothnia the surface-water is so fresh that ships in harbour habitually take their water-supply from the sea alongside. The salinity increases from the surface downwards, but the low salinity of the surface layers and the excess of water which the Baltic receives from rainfall and rivers compared with what it loses by evaporation, result in a general outflowing surface current into the North Sea, called the Baltic stream. The rotation of the earth deflects the main part of the Baltic stream towards the coast of Scandinavia, and the variations in discharge of the Baltic rivers between summer and winter make the stream periodic in flow. In winter it is weak or non-existent.

The lower saline waters of the Baltic must have been originally derived from the North Sea, and may be renewed at times, but their horizontal circulation is prevented by the plateau at the entrance to the Baltic and the ridges which separate the various hollows from one another. There is practically no circulation in these lower layers, which are consequently deficient in oxygen and uninhabited by marine organisms.

The colour of the Baltic generally appears to be a yellow-green and the shallow waters near the coast are often turbid with the discharge from the rivers. In the open sea the waters are clearer, though never so transparent as the waters of the Mediterranean.

Ice

The high northern latitude of the Baltic results in many parts of it freezing every winter, and the formation of ice is facilitated by the low salinity of the water and the almost complete absence of tides. The north, the Gulf of Bothnia, and the east, the Gulf of Finland, are most affected, for they are furthest removed from Atlantic influences and experience continental conditions of climate.

The first essential in the formation of ice is a lowering of the temperature, but this alone would have merely a temporary effect on the surface of the sea, for the new ice would be broken by winds and waves as soon as it formed, and would never attain sufficient thickness to be a menace to navigation. A continuous covering of ice forms on the sea only when low temperatures are accompanied by high barometric pressure and calm water. And high barometric pressure is the atmospheric condition most favourable to the occurrence of low temperatures in winter. The formation of ice begins in coastal waters and quickly spreads seaward. If the conditions persist a thick covering of ice results. The seaward edge of these ice-fields is broken by gales and carried, as pack-ice, before winds and currents, only to be refrozen when low temperatures and calms again prevail. Pressure, resulting from continuous strong winds, may pile the pack into ridges, and though these may collapse on the release of the pressure, they often freeze together and give irregularity to the sea-ice. The frozen area grows in extent and thickness during the winter and the seas may be solid from shore to shore or some moving ice or open water may remain in the middle. Sea-ice is never smooth, even when newly formed, and in a few days it is covered with snow, which by midwinter has grown to such a thickness that its weight has depressed the actual ice to below sea-level. Snow alone is then visible.

Spring insolation has little direct influence in thawing the ice, but the surface-water derived from melting snow floods and rots it. It becomes porous and readily broken by winds and waves, while the temperatures are too high for the fragments to freeze together again, even in calm weather. The disintegration of the floes results in streams of pack-ice which, drifting with winds, may be as great a hindrance and a greater danger to navigation than more fixed winter ice. But the drifting ice in spring being continually exposed to air and surface layers of water at a higher temperature, melts rapidly. Nevertheless, fields of pack may be encountered even in July in the Gulf of Bothnia.

The ice conditions in the Kattegat and the Sound vary much from year to year, but it is only in most exceptional winters that the Sound is frozen solid from side to side. In the last century this occurred in 1830 and 1836. On the other hand there have been winters so unusually mild that the only ice in the Kattegat and Sound has been in shoal water near the shore. Normally these waters are open to navigation all the winter, but drifting ice presents some difficulties. It seldom appears before January and sometimes later, and is heralded by persistent easterly winds which bring low temperatures. Ice forms first in the Kattegat and later in the Sound. Sufficient pack may be encountered in the Kattegat and Sound to prevent steamers entering the Baltic, and there is generally a period during which the passage is impracticable for sailing vessels unassisted by a tug. Drift-ice from the Baltic increases the obstruction of the Sound, and the outflowing current which brings that ice, being cold and fresh, aids the formation of ice along the Swedish coast. There have been winters when there was thin ice in the Kattegat at a time when the Sound was quite open. It is seldom, however, that the passage to the Baltic and the ports of the Kattegat and Sound cannot be kept open all winter with the assistance of ice-breakers, at least for vessels with steam power. The Helsingör–Hälsingborg ferry runs all winter. By the third week of March there is seldom any ice in the Kattegat or Sound. The Sound may be obstructed after the Kattegat is clear, but in that case there is generally a passage by the Great Belt.

The ice conditions in the Baltic vary from year to year with the prevailing meteorological conditions, but it is very rare for the western Baltic to be frozen. Only in exceptionally severe winters is some drifting pack found to the south and south-west of Sweden, and there is never continuous ice across the sea. Large fields of ice are rare and generally break up in a few days. The central part of the Baltic from Öland and Gotland northward to the Åland Sea often has a good deal of pack-ice, and there is generally ice every winter along the

coast and among the islands of Sweden in this part of the Baltic. It is only in exceptionally mild winters that navigation can continue uninterrupted in these waters.

The greater part of the Gulf of Bothnia and the Gulf of Finland is frozen every winter. By the beginning of December the head of the Gulf of Bothnia to Hailuoto (Karlö) Island is frozen, and during that month the ice spreads rapidly along the east and west coasts to about lat. 63° N. In a mild winter the new year sees the coasts north of lat. 62° N. blocked with ice, but the high sea of the gulf open. In a severe winter, on the other hand, only the southern centre of the Gulf of Bothnia, including the Åland Sea and archipelago, is open in early January, and the greater part of the Åbo archipelago is ice-bound. By this time only the extreme head of the Gulf of Finland is frozen. In an open year, like 1904, the middle of February corresponded with the beginning of January 1905, which was a hard winter in the Baltic.

By March the ice has reached its widest extent. The Gulf of Bothnia except the Åland Sea is frozen, and the Gulf of Finland is only open at its entrance. Even at this season, however, the south and south-west of the Åland Islands are free of ice, except a little drifting pack. In exceptionally mild winters like those of 1902–3 and 1905–6 the Gulf of Bothnia remains open up to the coastal waters which are always frozen. Probably it is only in the severest winters that the centre of that gulf is frozen, though in normal winters there is always drifting pack. Only in nine winters last century was the Åland Sea frozen sufficiently to allow traffic over the ice between Sweden and Finland. Sledges crossed in 1809, 1836, 1844, 1855, 1871, 1881, 1888, 1893, and 1895.

The break up of the sea-ice in spring is slow and depends on the prevailing winds, for the temperatures are still low. To the south of the Åland Islands, at the lighthouse of Bogskär, what little pack there is is scattered by about March 20. By the end of March the limit of the fixed ice is at the south-west of the Åbo archipelago. Practically the whole of the Gulf of Finland except the south-west is frozen. On April 1

it is improbable that any Finnish ports except Hangö and Mariehamn are accessible, but Swedish ports as far north as lat. 62° N. or 63° N. may be open if easterly and south-easterly winds do not prevail and carry the loose ice over to the Swedish coast.

During April the break up of the sea-ice is still slow. By April 20 there is open sea up to Seitskär Island, towards the head of the Gulf of Finland, but the south coast of Finland is still ice-bound. In the Gulf of Bothnia the coasts are beginning to clear and the greater part of the sea is clear to lat. 63° N. At the end of April the ice is breaking up in the Åbo archipelago and round the south and south-west coasts, except in the more sheltered bays. In the Gulf of Bothnia the coasts north of about lat. 63° N. are still blocked, but the open sea is not far from the coasts. In May there is no ice in the Gulf of Bothnia south of Hailuoto, except a little which lingers among the islands from Jakobstad to Gamlakarleby. By the end of May all this ice may have gone or it may linger on till June. Early in May the Gulf of Finland is clear of ice.

All these conditions must be taken as averages. As already mentioned, there are considerable variations from year to year, and the break up of the ice does not mean that the seas are clear, although they can be navigated. After the winter ice in a port has broken up access to the port may still be difficult on account of drifting pack. A severe winter will probably cause at least one side of the Gulf of Bothnia to be blocked with ice unduly late in the season. Ports may thus be cut off from communication for several weeks after they are open. In the case of a port like Åbo, reached through an archipelago, one channel may be free of ice while others are blocked.

Opening and Closing of Ports

The following table gives the date of closing of Finnish and Russian Baltic ports. The extreme dates are given, but in many years the closed period is shorter.

Torneå	Late October—end of May.
Kemi	Early November—late May.
Uleåborg	October 25 to November 24—May 6 to June 13.
Brahestad	Middle November—late May.
Ykspila	Late November—April 28 to June 2.
Jakobstad	November 15—May 15.
Nykarleby	October 17 to November 4—end of May or middle of June.
Nikolaistad	Early December—late April or early May.
Kaskö	November 28 to December 28—late April or early May.
Kristinestad	Late November or early December—early May.
Björneborg	Middle December—April.
Raumo	Middle December—April 12 to May 4.
Nystad	December 3 to January 25—April 4 to May 3.
Mariehamn	Never closed.
Åbo [1]	November—April: 1904 and 1912 never closed.
Hangö [1]	Never closed.
Ekenäs	November or December—early May.
Helsingfors [1]	End January—end April. Not closed 1909–10.
Borgå	Late November—early May.
Lovisa	Early or middle December—late April or early May.
Kotka	December 30 to January 24—April 10 to May 6.
Fredrikshamn	December—late April or early May.
Viborg	Middle December—end April or early May.

[1] An ice-breaker stationed at these ports keeps the channel open throughout the winter. This could be done at several other ports if ice-breakers were available.

Kronstadt [1]	November 12 to January 20—April 9 to June 5.
Petrograd [1]	November 19 to December 25—April 11 to May 9.
Narva	Late November or early December—end April or early May.
Reval [1]	January, February or March for three weeks.
Port Baltic	February and early March in severe winters only.
Hapsal	November or December—February or March.
Gulf of Riga	January—end March : never closed in mild winters.
Pernau	Late November to late January—late April or early May.
Riga	December 20 to January 30—Middle April : some winters never closed.
Windau	Late November—middle March.
Memel [1]	Seldom closed.

[1] An ice-breaker stationed at these ports keeps the channel open throughout the winter. This could be done at several other ports if ice-breakers were available. In Kronstadt and Petrograd the closing can be delayed, but not averted.

CHAPTER III

CLIMATE

General Characteristics—Temperature—Pressure—Winds—Precipitation

SYSTEMATIC meteorological observations in Finland began with the foundation of the meteorological observatory of the University of Helsingfors in 1844. Since then many other well equipped observing stations have been founded throughout the country For the international meteorological scheme of 1882–3 Finland founded a station at Sodankylä in lat. 67° 24′ N., long. 26° 36′ E. In 1910 there were 42 meteorological observatories in the country besides many other stations taking temperature and rainfall observations. In addition, the stations in Norway and Sweden and in Arctic Russia are of great value in a study of the climate of Finland. Data for a detailed study of the climate of Finland are, however, inadequate.

GENERAL CHARACTERISTICS

Its intermediate position between the seaboard countries of Europe to the west and the interior countries to the east gives Finland a climate in which both maritime and continental influences play a part. From the east come continental influences, high summer and low winter temperatures, the latter accentuated by the high latitudes, light dry winds, and scanty rainfall, while from the west come the mollifying influences of strong humid winds, warm in winter, and cool in summer. The maritime influences, re-enforced by the Baltic, which is itself protected from the open ocean by mountains on the west, can scarcely overcome the continental influences, and so the climate of Finland more nearly approaches that of Arctic Russia than that of Western Europe. The many lakes of Finland, more especially Ladoga, tend to increase the maritime character of the climate in summer.

The climate of Finland taken as a whole is cool with a brief hot summer and a long severe winter. Rainfall is not heavy, averaging some 20 inches a year, but cloudiness is a marked feature except in summer. Coastal fogs are common and are a great hindrance to navigation. Frosts frequently occur out of season and do great harm to crops. Dew is heavy. The prevalent winds are west and south-west. Strong gales are not common, but summer thunderstorms are frequent.

The Arctic Circle cuts through Lapland so that the extreme north of the country has the sun continually above the horizon for some days in summer and for a corresponding period below it in winter. The rest of the country has little darkness in summer and little daylight in midwinter.

Temperature

The general tendency in the distribution of temperature is a decrease from south to north throughout the year, but three factors, all of the same nature, interfere with the regularity of this march. Firstly, the Gulf of Bothnia acts as a source of warmth for most of the year carrying higher temperatures northward along its coasts, but from April to July it brings lower temperatures southward. Secondly, the Gulf of Finland has a similar effect eastwards in winter, but to a less degree, and some cooling influence in summer. Thirdly, Lake Ladoga is a centre of notably low temperature in summer while in winter it marks the centre of an area of somewhat higher temperature than the surrounding country. In spring and autumn these stretches of water have least effect. The general tendency, however, is for the thermometric gradient to be steep from the coasts inland in winter, and less so in summer. That is to say that the sea has more warming influence in winter than it has cooling influence in summer. In the extreme north of Lapland the ameliorating influence of the open Barents Sea makes itself felt throughout the year by increasing temperatures in winter and decreasing them in summer, or in other words by a tendency to modify the extremes of Lapland to a more uniform temperature such as

obtains along the northern coast of Norway. The Atlantic influences to the west are not felt in the temperatures of Finnish Lapland. The higher elevations of the east and north emphasize of course the lower temperatures due to distance from sea, while on the other hand the low elevation of the coastal regions gives them all the benefit possible from the effect of the sea. The general result is that the south-west is warmest and the north coldest in winter; in summer, when the maritime influences have less effect than the continental ones, the south-east is the warmest part of Finland. The extremes are greatest in Lapland (47° to 52° F.), and least in the south-west (at Bögskar 32·6°). Winter lasts from December to February, and February is generally the coldest month with a mean temperature varying from 37·4° F. at Bogskär to 3° or 5° F. in Enontekiö. Another centre of cold is in eastern Karelia with a February mean of 10·4° F. At the head of the Gulf of Bothnia the temperature is 10·4° F. and at Hangö 21·2° F.

The spring months are March, April, and May. Temperatures rise rapidly to 41° F. at Torneå in May, 37·4° F. in Enontekiö, 44·6° F. at Hangö, and 42° F. at Bögskar. But in the south-west March is often the coldest month.

Summer lasts from June till August. In July Torneå has a temperature of over 47° F., Enontekiö of over 53° F., Hangö of over 60° F., and Viborg 62° F. Bögskar has a July mean of 59°. August is sometimes the warmest month in the south-west. In autumn the fall of temperature is rapid. At the head of the Gulf of Bothnia the temperature falls from 46° F. in September to 34° F. in October, to 24·8° F. in November, and to 15·8° F. in December. The temperature of Hangö falls from 51·8° F. in September to 28·4° in December. By December winter conditions are established.

Pressure

The general course of the isobars is south-west and north-east across Finland with a low gradient decreasing towards the north-west. In winter it is steepest and decreases in spring.

In summer the pressure is lower and almost uniform throughout the country, increasing beyond its confines to the south, west, and north. In autumn the winter distribution of pressure begins to set in again. Except during summer, the pressure drops more or less rapidly towards the low-pressure area over the Atlantic to the north-west.

Winds

The normal pressure gradient to the north-west causes prevailing south-west winds. Towards the north of the Gulf of Bothnia and the east of the Gulf of Finland these winds have a more southerly component. At Uleåborg and at Sulkava (near Nyslott) the chief direction is even south-east. The steeper gradient in winter makes these south-westerly and westerly winds strongest at that season. In spring they are slight, and as the summer distribution of pressure begins to take effect the winds from the northern part of the Gulf of Bothnia blow more from the west and north-west, and in the south-east of Finland, from the south-east. When the summer low-pressure area is fully established the general tendency is for the winds to blow inland from the sea, including north and north-east winds in the north of Lapland from the Barents Sea. Towards the interior all these inblowing winds are light and variable, but northerly ones are most frequent. But the warmer the summer the lower is the pressure over the land, and, in consequence, the stronger are these winds. Strong winds are less frequent in the interior in winter, where calms often occur. In many parts of the country there is an alternation of land and sea breezes between night and day, which may overrule the prevalent winds. Thus at Helsingfors in June it is usual to have a north-west wind at midnight going round by north to north-east and suddenly changing to south-east between 8 and 9 a.m., and reversing again between 9 and 10 p.m. The sea breezes during the day are often felt many miles from the coast along the Gulf of Bothnia. Around some of the larger lakes the same phenomenon occurs on

a smaller scale. It was recorded at Kajana in the summer of 1901 that at 2 p.m. north-west winds were three times more frequent than south-east winds, but that at 7 p.m. the reverse was the case. In summer calms are most frequent at night and the wind force increases with the insolation. As a general rule the most frequent winds are the strongest. Thus at Helsingfors south-west winds are strongest, next come east winds, while south-east winds are rare and gentle. Cyclonic gales, moving from the south-west, occur, but are not frequent. At Helsingfors a wind force of 9 on the Beaufort scale occurs on an average eight times between November and March every year and twice in the other months except June and July, when it never occurs. December is the month of greatest frequency of gales, and they are commoner in the south-west than elsewhere in Finland. In Lapland they are rare.

Thunderstorms frequently occur in summer, particularly in the south and south-east. They are much rarer in the colder regions of the north. The cooling effect of Lake Ladoga seems to have much to do with their frequence in that region.

Precipitation

The annual amount of precipitation is unevenly distributed, but shows a general diminution towards the north. In south-west Finland, Nyland, southern Karelia, and Savolaks it is over 26 inches a year. At Lovisa as much as 32·75 inches have been recorded, and at Lohja 30 inches. In Tavastland and north Savolaks it varies from 18 to 20 inches; at Sodankylä it is 14 to 16 inches, and in Enontekiö 12 to 14 inches. On the west coast it is 18 inches, and in eastern Karelia 20 inches. The greatest precipitation recorded in any one day was 3·8 inches at Kajana in July. The low-pressure conditions of summer cause July and August to be the months of greatest precipitation, and this is more marked in the interior and in Lapland than on the coasts. In the south-west of the country October is generally somewhat wetter than August. As a general rule the last six months of the year are wetter everywhere than the first six, but there is no

marked dry season. It follows from this that most of the annual precipitation falls as rain. Nevertheless, deep snow is a characteristic feature of the Finnish winter, and this is important because to some extent it prevents the frost affecting the ground to a great depth, which would retard vegetal growth in spring. From October to March practically all the precipitation is in the form of snow. In Lapland the period is longer by a month or more, and in the south-west of the country a little shorter. The earliest fall of snow occurs about the end of September in the north of Lapland and Enontekiö. Two weeks later all Lapland is covered with snow, and there have been falls southward throughout the lake plateau although all the coast regions are probably still free. By the end of October the whole country has a covering of snow. These dates vary from year to year. Snow may fall throughout the country in September, but it seldom or never lies on the ground. At the Åland Islands there may be snow on the ground early in October in exceptional years. In the extreme north of Lapland snow has been known to fall as early as August. On the other hand there have been exceptionally mild autumns when Lapland had to wait till October for its first snowfall, the south-west coast till late November, and the far-out islands till December.

The depth of the snow depends on the temperature as well as on the amount of fall, and the greatest depths occur in the north and east where the temperature is lowest and the precipitation least. As a rule the whole country has a 2-inch covering of snow by the third week of November except the coastal regions with one inch and Lapland with 5 or 6 inches. In December there are 2 inches in the Åland Islands and 4 inches in the south-west of the mainland. Towards the north and east there is a steady increase in depths. In northern Karelia and in Lapland there are 12 to 14 inches and about Lake Inari 14 to 16 inches. The depths continue to increase till March, when the snowfall is deepest, with 8 inches in the Åland Islands, 16 inches in south-west Finland, 20 to 24 inches in Österbotten, and 30 inches in parts of Lapland.

In April the thaw begins. The snow in the Åland Islands melts quickly, but the rate of thaw decreases towards the interior of Finland and Lapland. By the end of May the whole country except the far north is usually clear of snow.

The freezing and thawing of the rivers and lakes is discussed in Chapter I, and ice in the Baltic in Chapter II.

CHAPTER IV

VEGETATION AND ANIMAL LIFE

Vegetation—Birds—Mammals—Fish—Insects

Vegetation

Despite its high northern latitude the vegetation of Finland is rich, even if the number of common species of plants is small. There are about 1,000 species of flowering plants, but only half of these are common. On the other hand, there are over 2,000 species of mosses and lichens. The flora differs somewhat from that of Arctic Russia, and these differences increase from east to west, as the flora becomes richer. Among the larger species of Russian plants which are mainly wanting in Finland are the Siberian larch, the cembra pine, and some kinds of willow. But in general aspects the vegetation is the same in Finland and in the Arkhangel province of Russia. Forests predominate almost everywhere. Originally Finland must have been clothed in forests from end to end except on some parts of the coast and in the elevated parts of the north-west of Lapland. Many forests have now been destroyed by fire, cut down for timber or cleared for arable land, yet they still form the chief feature of the vegetation. The forests are chiefly coniferous. The Scots pine (*Pinus sylvestris*) is the dominant species on drier ground, such as the many *åsar* and sandy ridges, and it occurs also in peat bogs. Towards the north of Lapland it is gnarled and stunted. The pine is sometimes mixed with other trees, but more frequently it is the sole species in the forest. The spruce or fir (*Abies excelsa*) grows best on more fertile and wetter soil, and is often found in marshes. It is more frequent than the pine only in the south-west and in the northern part of Karelia towards the Russian frontier. As often as not spruce forests

contain other species. The larch (*Larix siberica*) is not indigenous, and occurs only in a few plantations. The yew (*Taxus baccata*) is rare and occurs only as a shrub. The oak (*Quercus pedunculata*) is native only in the extreme south and the Åbo archipelago, but it has been planted as far north as Torneå. The elm (*Ulmus montana* and *U. effusa*) extends little north of lat. 62° N. and never forms forests. The birch (*Betula verrucosa* and *B. odorata*) is the essential species in Lapland and the north of Finland, occurring as a rule in mixed woods. It grows beyond the limits of the pine to the extreme north of the country. In lands that have been laid waste by fire the birch is generally the first species to grow and afforest the country-side. The alder (*Alnus glutinosa*) is a forest species only in the extreme south, especially in marshy ground. Elsewhere it grows along river and lake banks. The white alder (*Alnus incana*) was originally only to be found along water-courses, but it has spread widely in Karelia, Savolaks, and Tavastland, and beyond Kajana. The aspen (*Populus tremula*) is widely spread but grows large only in fertile lands. These comprise all the kinds of forest trees in Finland, but other species occur which seldom if ever form forests. Among them are the mountain ash, the plane, ash, lime, hazel, and several willows.

There is an abundance of undergrowth, but generally the forests are sufficiently open not to impede progress in any direction. On drier and poorer lands, or where forest has been destroyed by fire, heather often prevails, and juniper bushes are common. Wet meadows cover large areas and usually occur round lakes and along rivers. These meadows resemble those of England, with luxuriant grass and many wild-flowers. The wetter they are the greater is the proportion of moss to grass until in places they pass into swamps of bog-moss. In parts of Finland marshes are common, in the east and to a less extent in the west, but in many parts of the centre they are rare. The south-west is almost free of them south of lat. 62° N.; on the other hand the northern half, with the exception of the extreme north and north-west, is almost

entirely covered with marshy ground in one form or another. More or less wet peat bogs cover some 20 per cent. of the total area of the country, but they often bear trees, and so must be included in the forest area. The forest in these cases consists of short pines, more rarely of birch and spruce, and over the carpet of mosses there is often an abundance of low-growing bushes. When the peaty regions are drier, pines flourish and there is an undergrowth of heather and much reindeer 'moss'. These peaty forests are most common in the south-west. The wetter marshes are usually near lakes or along rivers and bear spruce, birch, and alder, but rarely pines. In places round the coasts there are low-lying areas, liable to be inundated by the sea. As these become drier the mosses which cover them give way in part to heather and other low bushes, which in their turn give way to pines.

Real tundra, the open steppe lands of the Arctic shores of Siberia and Russia, is little represented in Finland. In most parts Finnish Lapland does not go north of the area of birch forests, but in the extreme north it touches the tundra-covered wastes of the Arctic shores. The rocks of the mountains in the north-west bear no vegetation except scattered mosses and lichens. In the interior there are practically no barren areas, but on the coasts of Karelia and Österbotten there are several sandy wastes and moving dunes.

In most parts of Finland there is a profusion of edible berries in July and August, wild strawberries, raspberries, cloudberries, bilberries, cranberries and currants.

Finland may be divided on broad lines into four zones of vegetation, the boundaries of which are approximate to parallels of latitude. These zones, characterized by their prevailing species of forest trees, hold good also to the east of Finland in Russian territory, at least as far as Lake Onega and the White Sea. In the extreme south of Finland is the zone of oaks, the northern boundary of which runs from between Nystad and Nådendal to Borgå and along the coast by Viborg to the south-west corner of Lake Ladoga. Northward of this to about lat. 62° N. lies the zone of leafy

trees, in which are found the lime, elm, maple, ash, and wild apple. In central Finland from lat. 62° N. to about lat. 63° 30′ N. is the zone of the plane, with the birch becoming more frequent towards the north. The zone of conifers extends to about the Arctic Circle or lat. 67° N, where it gradually merges into the zone of birch and tundra which covers northern Lapland. Throughout these zones from south to north there is a general decrease in the luxuriance of the vegetation and the abundance of undergrowth, though local conditions of fertility, as for instance a sheltered river valley, may reverse this order.

Birds

The fauna of Finland shows few distinctive features compared with that of Russia or Scandinavia. Most of the species are widely spread beyond Finland in northern Europe, Siberia, and even to the Mediterranean. In common with other parts of Europe Finland has the swallow, grey wagtail, cuckoo, thrush, and yellow-hammer. All these are widely spread. Other species of birds have a more localized distribution where their own peculiar environment occurs. On the islands of the south-west are eider-ducks, terns, and plover; in the bays and inlets of the coast are wild duck and grebes. The lark, partridge, and land-rail are found in swamps, the wheatear in stony places, and the sparrow and swallow near habitations. The shrike, warbler, and nightingale occur in copses, the chaffinch in leafy forests, the grouse in pine woods, and teal and other ducks along the lakes and river banks. Throughout Finland, in fact, bird life is abundant, although in winter it is greatly decreased by the many species which then migrate southward. Certain marine species have become acclimatized away from the sea. This is not surprising when the great extent of lakes is remembered. The Arctic tern is abundant in the north of the country, and the silver gull on Lake Ladoga and other lakes. Every zone of vegetation has its characteristic bird life. On the tundra of the north of Lapland are such Arctic birds as the snow-

bunting, dotterel, willow-grouse, snowy owl, gyr-falcon and others. In the birch forests Arctic species are less frequent, and in the coniferous forests the bird fauna is more reminiscent of Scotland. The forests of deciduous trees have most birds.

Mammals

Finland has nearly all the mammals of the northern regions of the old world, except decided Arctic species such as the polar bear. The reindeer is found in a wild state in Lapland, and wanders south into Karelia: it remains chiefly in the forests. The Lapps mark their herds on the ears in spring and then let them loose. These herds give a false idea of the number of wild reindeer in Lapland. The Arctic fox, the glutton or wolverine, and the lemming are also confined to the north, and seldom found south of the Arctic Circle. The beaver is extinct. The elk, after being threatened with extinction, is now protected by law. The ermine is still found in the north, but the high price obtainable for its skins has much reduced its numbers.

The bear, wolf, and lynx are still numerous in parts, but are gradually disappearing before the advancing settler. It is many years since a price was put on the heads of these animals with a view to reducing, or even exterminating them all. In 1893 the head-price of a bear ceased, and the hunting of bears has since been forbidden in certain parts of the country declared to be national parks. The bear is now found only in the far north and in the Russian frontier lands. It is still common in Russian Karelia, but promises before long to become extinct in Finland.

The wolf is plentiful in Lapland and is still found in the heart of Finland, but energetic measures taken against it have much reduced its numbers. The number killed decreases year by year, but the wolf still causes ravages among reindeer in the Inari region and Enontekiö. As late as 1882 it was not uncommon for children to be killed by wolves within a few miles of big towns like Åbo and Tammerfors.

The lynx used to be plentiful in the south of the country;

now it is very rare, and in the western half of Finland practically extinct. The lynx is not found in the far north. This may be due to the numbers of wolves, for the wolf is the greatest enemy of the lynx.

A few species of northern seals are found in the coastal waters, particularly in the south-west. One species has become naturalized and evolved a sub-species in Lakes Ladoga and Saima. The porpoise is the only representative of the whales. The walrus is not known in Finnish waters.

Fish

Fish are numerous in Finnish waters. Most of them are fresh-water species. Owing to the low salinity of Baltic waters (p. 35) fresh-water species can live in the sea, but on the other hand sea-fish find some difficulty in penetrating the Baltic and their number decreases with the diminishing salinity towards the heads of the Gulfs of Bothnia and Finland. The cod, flounder, turbot, and sprat are among the sea-fish of the Baltic, but none of them reaches the heads of the gulfs. The turbot reaches only the mouth of the Gulf of Bothnia, and half way along the Gulf of Finland. The herring is one of the few species that has become accustomed to the brackish waters, and it is found in a small distinctive form. Fresh-water fish are found in almost all parts of Finnish coastal waters, including the perch, lote, gwyniad, vendace, roach, bream, and pike, but many of them do not go far out to sea. The perch and pike, which go farthest, do not reach the open sea. Many migratory species are also found, such as the salmon, salmon trout, eel, lamprey, smelt, &c. But though the waters of the Finnish coast have many species they do not abound in fish, like the North and Arctic seas, and since they are neither salt nor fresh no species finds the conditions most favourable to its growth.

In the lakes and rivers of Finland there are several species, such as the trout and red charr, in addition to those above mentioned, but none of the waters is rich in fish. The salmon

and the pike, found both in the north and south, are most widely spread. Fresh-water crayfish are common in the southern lakes.

Insects

The insect fauna of Finland is rich, but there are not many insects harmful to crops. Turnips sometimes suffer from a pest, and so do grass meadows. Several insects injure forest trees. But by far the most pestilential insect in Finland, as in all sub-arctic countries, is the mosquito. The swampy nature of Finland gives ideal conditions for breeding, and mosquitoes swarm practically everywhere in midsummer. There is no feature of Finland which causes greater discomfort and trouble to man or beast, although the northern mosquito does not appear to carry serious disease (see Chapter V). The Finns are in the habit of burning juniper bushes to drive them away, and the thick smoke is generally found to be a lesser evil than the irritation of the mosquitoes.

CHAPTER V

INHABITANTS

Population—Races—Language—Religion—Education—Press—Socialism and the Labour Movement—Co-operation—Condition of the Peasantry—Drink Question—Public Health.

Population

In 1914 the population of Finland was said to be 3,269,401, but this figure is an exaggeration, as explained below (p. 58). Of the total, 15 per cent. were town dwellers and 85 per cent. lived in the country. The urban population is growing steadily at the expense of the rural. In the town women outnumbered men by 13 per cent., but in the country men were 1 in 1,000 more numerous than women. The birth-rate seems to be diminishing slightly, but so also is the death-rate. In 1914 the birth-rate was 26 per 1,000 and the death-rate 15. The density of population was nearly 23 per square mile, but this figure can convey little idea of the distribution of the inhabitants owing to the varying physical conditions of the country and the large area covered by water.

Immigration to Finland is small. Less than 1 per cent. of the population is of foreign birth and this is mainly Russian (·5 per cent.) and to a less extent Swedish (·2 per cent.).

Emigration has only become important in the last thirty or forty years. Until 1880 only about 1,000 persons emigrated annually, and they were chiefly from the Vasa district in Österbotten. For many years, however, emigration has been increasing. The figures for the whole country are not obtainable before 1893, but the following give some idea of how Finland is losing her population.

Year.	*Total Number of Emigrants.*
1893	9,117
1895	4,020
1900	10,397
1902	23,152
1905	17,427
1910	19,007
1911	9,372
1912	10,727
1913	20,057
1914	6,474
1915	4,041

The great motive for this steady exodus was the dislike of Russian rule, but contributing factors are also the land laws and the difficulty the peasants find in obtaining land of their own (see p. 105). Most of the emigrants are young men who in the course of a year or two, when they have made a new home in America or Western Siberia, send for their wives and children. It was estimated that in 1917 there were nearly 300,000 Finns in the United States. They are principally in the states of Michigan, Minnesota, and Massachusetts.

While the emigration figures of Finland are reliable care must be taken in any comparisons made between them and the figures of the total population of the country. Apparently it is the custom to retain on the register the names, and to add to the population totals the numbers, of emigrants unless they notify the authorities that they have become naturalized abroad or until news of their deaths arrives. In this way the total population, as given, is in excess of the actual population. It is difficult to say to what extent the figures are wrong, but probably it would be safe to deduct at least 150,000 to 200,000 from the figure (3,269,401) given above.

According to occupation the population of Finland is divided as follows (1900) :—

	%
Agriculture and allied occupations	57·3
Hunting and fishing	0·6
Industry	10·6
Communications	2·8
Commerce	2·0
Professional and public services	5·5
Unclassified	15·9
Unknown	5·3

These statistics, however, must be taken only as approximations. The low percentage engaged in fishing is due to the fact that most fishermen are primarily agriculturists and follow fishing only as a subsidiary occupation. The relative decrease in agriculture in favour of industry is marked. In 1865 the agricultural population was 79·3 per cent., in 1890 it was 74·3 per cent., and in 1900 it had fallen to 57·3 per cent. On the other hand the industrial population in the corresponding years had increased from 4·9 per cent. in 1865, to 8 per cent. in 1890 and 10·6 per cent. in 1900 and is still increasing.

Races

There are two distinct races in Finland, the Finns and the Swedes. The Finns, the oldest element in the population, account for 90 per cent. of the people, and of the remainder the greater part are Swedes. There are in addition several hundred Lapps and a few thousand Russians.

The Finns

The Finns are generally thought to belong to the Finno-Ugrian family, a people of Mongolian origin allied to the Lapps and Ostyaks, and more remotely to the Magyars, Turks, Mongols and Manchus. Starting from Persia they were among the earliest invaders to cross the Urals and entered Finland perhaps some twelve to fourteen centuries ago (see Chapter VI). Evidence of their eastern origin is afforded by the historic necklace found in Tavastland, which consists of silver Persian coins belonging to monarchs of the Samanid dynasty, who were ruling over Persia in the early Middle Ages. The Finnish language proves that they had considerable intercourse with Aryans and Slavs on the way.

Physically, the Finns are hardy, muscular, short and thick-set, with almost round head, low forehead, flat features, prominent cheekbones, eyes mostly grey and oblique (inclining inwards), short and flat nose, protruding mouth, thick lips, full and strong neck, so that the occiput seems flat and almost in a straight line with the nape ; beard weak and sparse hair,

once probably black, but owing to mixture with other races, now brown, red and even fair; complexion darkish. In character they are morally upright and hospitable, possessed of patient and passive strength, courage, tenacity, prudence, fidelity, respect for law and a passionate love of freedom. The last quality has doubtless been accentuated by their long subjection to foreign rule. On the other hand, they are stolid, slow, and vengeful, with little sense of humour. They set great value upon education, esteeming knowledge above wealth, though of recent years, especially in the towns, there is a marked increase of materialism among the young generation.

British sailors often show a prejudice against sailing with Finns to whom they attribute uncanny powers. This prejudice is perhaps due to their non-European origin and alien legends and traditions.

There are two marked divisions of the Finns, the Tavastlanders, who entered the country from the south, and the Karelians, who approached it from the east and so found less fertile lands. The Tavastlander inhabits Tavastland, Satakunta, north Nyland and south Österbotten, except the coastline and Finland proper, where his kinsmen, the Esthonians, have mixed their blood and language with his. He is the most industrious and frugal, but the most conservative and stubborn of the Finns. In spite of his virtues, he is generally poor. He absorbs modern influences eagerly, as soon as they come within his reach.

The Karelians, on the other hand, dwell in Karelia, Savolaks and north Österbotten. They are slighter in build and more lively in character, being distinctly the most intelligent of the Finns. They are singers and poets, and the bright national dress is still commonly worn among them. In Russia many of them are wandering pedlars. They are less thrifty than the Tavastlanders, and are the butt of many Finnish stories. The runes of the *Kalevala* were better preserved among them than anywhere else in Finland and they are still famous for their singing.

It is noteworthy that deep wisdom and a gift of song are the chief qualities of the hero of the *Kalevala*. Moreover, his demeanour is invariably grave. Laughter is beneath his dignity. Clearly he embodies the national ideal.

Practically all the lower and middle classes are Finns.

The Finns were originally a military race, but stronger in defence than attack. It took the Swedes 150 years to conquer Finland bit by bit, and Russia about three centuries, despite the scanty population of the country. Its physical conditions, however, make it easy to defend. The separate Finnish army was abolished in 1899 and merged in the Russian army. Since 1912 there have been no Finns, except a few volunteers, in the Russian army, for Finland contributed an annual money payment in lieu of men (see p. 85). In 1918 Finland took steps to form a conscript army for her own use. The officers were to be trained in Germany.

The Swedes

The Swedish element in Finland dates largely from the days of Swedish rule, for there is little immigration nowadays. The Swedes are found along the coast, particularly in the south-west and along the Gulf of Bothnia. The Åland Islanders are practically all Swedes (see Chapter XI). There is also a large Swedish population on the coast of Nyland, stretching from Kotka in the east to Pargas in the west. Here the Swedes are partly engaged in agriculture. Elsewhere they are mainly sailors and traders. In the large towns there is always a high proportion of Swedes, who are the most prosperous class in the community.

The distinction between the areas occupied by Finns and Swedes is gradually breaking down and there is an increasing admixture between the two races. This is due, firstly to the increasing prosperity of the Finns and their consequent mingling with the higher classes, which were formerly exclusively Swedish, and secondly to the growth of factories which has brought Finns, as employees, into the Swedish districts. In Helsingfors, which used to be a Swedish town, over 30 per

cent. of the population is now Finnish. The Swedes, however, have never attempted to settle in the relatively unproductive interior of the country which is left entirely to the Finns.

The Russians

The Russian element in the population is a comparatively recent one and is mainly found in the south-east where it has filtered across the frontier. In and around Viborg is a large proportion of the Russians permanently settled in Finland. The number of Russians in Finland in 1900 was 6,000 and was increasing. In addition to the Russians in the Viborg district the figures include some functionaries and officials in the larger towns, but exclude the Russian troops who were stationed in various places on garrison duty. North of Lake Ladoga there is doubtless some movement of population to and fro across the frontier, but this is without effect on the races of Finland as the people on both sides are Karelians.

The Lapps

There are about 1,500 Lapps in Finnish Lapland. They are gradually withdrawing north or being absorbed by the Finns. They are divided into the Reindeer Lapps and the Fishing Lapps, the latter being either on the rivers, especially the Utsjoki, or round about Lake Inari. But the distinctions between the different kinds of Lapps are not very pronounced. The River Lapps often breed reindeer, while the Reindeer Lapps frequently turn their herds loose on the hills in summer and go to the lakes to fish salmon. Some of them go to the northern coast of Norway in summer. Many of the Lapps live in well-built wooden houses, and have stables of turf and peat for their herds. The River Lapps have often summer farms with potatoes, grass crops, some sheep, and even a few cattle. The Lapps of Enontekiö are the most primitive and still lead a nomadic life. They seldom build houses but live in huts. The Lake and River Lapps have horses, as well as reindeer in many cases, which they use in trading to and from the settlements on the Norwegian coasts.

Other Races

There are about 2,000 gypsies in the country, for the most part in the east and south.

The Jews in Finland in 1910 numbered 1,050, and the Germans about 2,000 (1913). The Germans lived principally in Viborg and Helsingfors.

Language

Language in Finland is to a great extent a criterion of race as far as Finns and Swedes are concerned, for the racial feeling is strong and amounts in fact to a caste distinction, at least on the part of the Swedes. Swedish is the language of the aristocracy, the descendants of the old conquerors, and to a decreasing extent of the cultured classes, while Finnish is the tongue of the lower and middle classes. As a literary language Finnish is handicapped by having had no written form common to all Finns until about a century ago. Before that it was entirely a spoken language of many dialects (see p. 82). These remain, though not so distinct from one another as they were in the past, but the literary form of the language gains ground, and as the Finns become more prosperous Finnish invades the cultured classes, threatening the monopoly of Swedish.

About 90 per cent. of the whole population speak Finnish and the remainder Swedish, but the number who speak only Swedish is decreasing. The majority of Swedes know Finnish also but some refuse to learn it, and others, despite their knowledge of the language, are unwilling to use it. As would be expected, the knowledge of Finnish among Swedes is most common in Finnish towns like Tammerfors and Viborg, and the knowledge of Swedish among Finns is most common in such Swedish towns as Åbo and Helsingfors.

Finnish alone is understood in the interior. In Lappland most of the Lapps speak Finnish. A few who trade with Norway have a little knowledge of Norwegian. Russian is little understood and less used except in the Viborg district.

The exhibition of street names in Russian as well as Finnish and Swedish in towns like Helsingfors is a quaint aspect of the Russification of the country (see Chapter VI). Since 1887 Finnish and Swedish have by law been on an equal footing for official use. Well-educated Finns and Swedes often understand English and German. Necessity compels the Finns to be good linguists, and education helps them. The occurrence of Scots names in Finland—Cockburn, Wedderburn, Keith, Ramsay—recalls the Scottish adventurers who took service in the Swedish and Russian armies in the Middle Ages. Most places in Finland have two names, Finnish and Swedish, and this leads to some confusion especially when the two names have no resemblance to one another, such as Turku and Åbo, or Porvoo and Borgå.

Religion

Nearly 98 per cent. of the population of Finland belongs to the Lutheran Church. There are also about 55,000 members of the Greek Church, mostly in the east, in the province of Viborg, and about 6,000 Protestants of other denominations, as well as some 500 Catholics.

The Lutheran Church is divided into four dioceses—the archbishopric of Åbo and the bishoprics of Borgå, Nyslott, and Kuopio. The Church is governed by a council, consisting of both laymen and clergy, the chapters of the dioceses, the parish councils and the assemblies of parishioners.

The Lutheran clergy are mostly peasant-born. The parish elects and pays its pastor. He has a house and glebe, which he generally tills, and the tithes are paid in kind, sometimes even in labour. The relationship between the pastor and the peasant is therefore very close. The parishes are often very large and the pastor sometimes keeps a curate. The pastor's wife works like an ordinary farmer's wife, often having to teach her own children in the remoter districts. Reference is made elsewhere to the valuable educational work done by the clergy. The church services are said to resemble those in the remoter districts of Scotland.

The churches, which are generally of wood, are uninteresting, though much pride is taken by the parishes in keeping them in good repair. The bell-tower is usually built separate from the church owing to the danger of fire. Growing improvement in artistic taste is said to be shown in the selection of the altar-pieces. The walls of many of the older churches are covered with the arms of the nobility. In every church is, or used to be, a framed copy of the Tsar's guarantee of the constitution. Open-air services are held in the remoter districts in summer. In winter the peasants drive great distances to church in sledges; in summer they go by the enormous church boats. These often have 16 pairs of oars, at which every one lends a hand, but they are being superseded in many places by steamers.

Of late years the Church has lost ground. The socialist movement, with which it has failed to keep in touch, is responsible for a good deal of anti-religious propaganda. But the chief cause is to be found in the attitude of the clergy towards the constitutional question. The majority gave way to Russia from motives of expediency, thereby losing the confidence both of the intellectuals and of most of the peasants and throwing away a golden opportunity of recovering lost ground.

Education

The great stimulus to education in Finland was given by the introduction of the reformed religion. A law of 1686 allowed no one to receive Communion who had not a knowledge of the Scriptures, or to be married who had not received Communion and learnt the catechism. Parents were expected to take their share in the work of teaching and were fined if they did not do so; the priest and sacristan were the chief teachers. These efforts were supplemented by the ambulatory schools, which still exist in the more remote districts. Children are expected to be able to read and to know their Bible before entering a primary school, where the average age is from 9 to 13. Virtually all books in Finnish were of

a religious character until the language was remodelled, as described (p 82). Not till then could a comprehensive system of popular education be established.

The following statistics show the increase of rural schools:

Year.	*Total Number.*	*Mixed Schools.*
1877–8 . .	357	172
1907–8 . . .	2,663	2,369

In 1915 there were 3,250 rural primary schools of higher grade.

In 2,279 schools the language used is Finnish; in 374, Swedish; while both Finnish and Swedish are taught in ten schools (1908).

In the town schools the age is from 7 to 13, and attendance is virtually compulsory.

Special attention is paid to sloyd, or handicraft, in the Finnish curriculum.

It is not easy to find sufficient trained teachers, in spite of the eight training colleges. They receive from the commune a house, garden, and firing, or an equivalent in money. The State pays single teachers of either sex an additional salary of Fmk. 900 (£36), and Fmk. 1,100 (£44) if they are married and have a family (1910). They are pensioned.

Though only 50 per cent. of country children attend school, virtually all those belonging to the Lutheran Church can read. The Russian government vetoed a bill of the Diet in 1910 which made education compulsory and extended the school course from 4 to 6 years in the country.

The State schools, as in Germany, are divided into classical (Lyceer) and modern schools (Realskolor) for boys; but there are only modern schools for girls. There are also a number of private secondary schools, run on the same lines. Mixed education has been largely tried in these, but there seems considerable difference of opinion as to the result.

The leaving examination from these secondary schools is equivalent to matriculation in the University of Helsingfors. This distinction is highly coveted by both boys and girls, and

gives the right to wear the student's cap; but only a small proportion of those matriculating, especially among the girls, complete the University course. The following figures, showing the sources from which the students of the University are drawn, are worthy of attention:

	Upper Classes.	*Middle Classes.*	*Lower Classes.*
1894–6:	%	%	%
Men students	51·8	30·7	16·6
Women students	75·0	21·5	2·9
1903–5:			
Men students	46·5	34·0	19·1
Women students	49·3	33·4	15·9

Another point of interest is the notable increase of Finnish-speaking women of the middle and lower classes, as compared with their Swedish-speaking sisters, who proceed to the University. In 1916 the University had 3,478 students of whom 866 were women.

An important feature in the educational system are the People's High Schools, the object of which is to arouse in the people an interest in questions of the day and in art and literature, as well as to give practical instruction in farming, housekeeping, and similar subjects. The average age of the students is from 18 to 20. These schools, which are open during the four winter months, have been very successful and are rapidly increasing in number. Many of them receive grants from the State. University students are also encouraged to travel about the country teaching what they have learnt. The plan has proved most beneficial to both the teacher and his pupils.

The difficulties in the way of a seeker after higher education in Finland will be realized when it is pointed out that the scholar is obliged to learn Finnish, Swedish, Russian, and German, together with Latin in a classical, or French in a modern school. But it is hard to see how he could get on without at least the four modern languages—Finnish, Swedish, and Russian are, of course, a necessity, but it is only through German or French that he can be brought into touch with the main body of thought of the outer world. A growing

number of Finns are also learning English. Every one who knows the country bears witness to the national ability both to acquire a liberal education and to appreciate its advantages. This can hardly be better illustrated than by the success of the Society for Home Research, which encourages every one to make a thorough study of his own home. Peasants have proved as enthusiastic and as useful in the work as men of the highest education. The results are sent to the head office in Helsingfors, where they are classified and arranged. The detailed information available for almost every aspect of Finnish history is largely due to the efforts of this society.

The latest statistics (1910) show that 107,504 of the population have received a higher education, 1,224,554 can read and write, 1,012,441 can only read, while 21,560 people over 15 are illiterate. Of the latter, hardly any belong to the Lutheran Church.

Press

In 1914 there were 391 newspapers and reviews published in Finland. Of these 274 were in Finnish, 103 in Swedish, 7 in Swedish and Finnish, 3 in Russian, 2 in German, 1 in English and 1 in French.

Socialism and the Labour Movement

The rise of an organized labour party like the spread of socialism dates from the year 1899, when Russia inaugurated her campaign of aggression. It was founded at Åbo. Many causes combined to awaken a consciousness of their power in the labouring classes, apart from the fact that ideas generally spread rapidly in small counties. Chief among these was the success of the passive resisters, who organized the great petition to the Tsar. Bobrikoff's contempt of law and tradition helped to destroy old sanctions, even among a conservative people like the Finns. Then came the stimulus of the revolutionary movement after the Japanese War.

Moreover, the great strike of 1905 assumed the subsidiary aspect of a revolt of labour against capital and produced a bitter class feeling. The first elections to the reformed

Diet revealed the astonishing progress of socialism in the country. The following analysis of parties in the Diet speaks for itself :

	1907. %	1910. %	1916. %
Socialists	37·0	40·0	51·5
Finns	27·3	22·1	16·5
Young Finns	13·7	14·5	12·0
Swedes	12·6	13·5	10·5
Agrarian Union	5·8	7·5	9·5
Christian workmen	1·5	2·2	—
Other parties	2·1	0·2	—

Almost more remarkable than the spread of socialism is the fact that it draws at least three-quarters of its adherents from the rural districts, owing to the discontent of the crofter and the labourer at their unsatisfactory positions. Trade-unionism has played but a small part in the success of the labour movement in Finland. Finnish socialism is Marxite in character, and is said to be still of a rather crude pattern, the excitement of class hatred playing far too large a part in its platform. Of the towns, Kotka, Uleåborg, Tammerfors, Kemi, Kuopio, and Björneborg have most socialists. The Swedish party and the Young Finns are largely recruited from the towns.

Co-operation

Nothing shows better the gift of the Finns for combined action than the success of the co-operative movement, which also dates from the ' annus mirabilis ' 1899, when the *Pellervo* was founded. The objects of this society are much the same as those of the Irish Agricultural Organization Society. In Finland co-operation was not the result of a movement among the peasants, but of a deliberate propaganda, which is rapidly leavening the whole agricultural life of the country, with the most satisfactory results. In 1911 there were 388 co-operative dairies, 398 loan and savings funds, and 430 trading-societies in the Grand Duchy. Virtually the whole of the great dairy industry is now worked on co-operative lines. A co-operative bank was opened in 1902.

Condition of the Peasantry

In the north, where the forests are not yet systematically developed, and in the east, where the peasants work on large Russian estates, there is much distressing poverty. The peasants even live in one-roomed hovels with the pigs and other animals. A bad harvest in these remoter districts is also much more serious in its consequences owing to the difficulty of bringing relief. At such times bark and chopped straw form the chief ingredients of the bread. In outlying places a few ' smoke cottages ', i. e. one-roomed cottages with no chimneys or windows, but only a smoke-vent, are still to be found, though strangely enough their owners often build a better dwelling for their guests near by.

In the south and the west, the best agricultural districts, we find large peasant holdings, such as are usual throughout Scandinavia. The owners are comfortably off, often possessing 4 or 5 horses, 20 or 30 cows, and good implements. In the west two-storied farm-houses are common. In the interior the houses are often grouped in villages round a lake, away from the fields. In Savolaks, which is really an archipelago, where fish is plentiful and the water mitigates the climate, the farms are commonly built on hills, where the land is easier to cultivate than in the undrained flats. This is the great dairy district, the aromatic herbs giving the butter a delicious flavour.

The farms, like the older houses in the towns, are built of wood. In the towns there is a tower with a watchman on the lookout for fires, which are still common, both day and night. On account of the danger of fire the farms usually consist of a number of separate buildings. They are often thatched with wooden shingles and frequently painted red. A separate building is often provided for guests. Inside, the farmhouses are unpapered, knives and other articles being kept in the crevices between the beams. Even in towns the houses rarely have blinds or shutters, in spite of the almost continuous daylight of the summer months. Over the stable is a loft,

which is used as a storehouse in the winter and as a bedroom for the girls in summer. But they often pass the summer in distant huts or cottages with the pasturing cattle, so as to be able to make the butter and cheese on the spot, without having to return to the farm. The girls take great pride in decorating their huts.

The well, with its pine-trunk with a stone at one end and the bucket at the other, is another unvarying feature of a Finnish farm. The most essential building is the bath-house for the vapour-bath, which is almost universal throughout the country. It is built first and serves as a dwelling during the building of the farm proper. The forest often comes almost up to the farm door in the wilder districts, and there are no gardens.

The farms, especially in the interior, are largely self-supporting. The Finns are wonderfully clever with their hands, and can do almost anything with their knives. During the long winter days and nights they work busily round the fire. Candle-making is an important home industry. Workmen, however, of all kinds, such as tailors, saddlers, or cobblers, travel from farm to farm, staying till they have done all the work necessary for the year for each customer. The farms are often very attractive and the farmers remarkably hospitable, hard though their lot often is. The kitchen is the centre of family life in winter. The enforced indoor life of the long winter evenings has not a little to do with the national love of reading and the high standard of education.

Even the poor peasants are hospitable and remarkably dignified in manner. They live very simply. Alcohol is rare in the country, but they are great smokers. Housing conditions are bad, though nearly all the cottages now have several rooms. Windows are often not meant to open and, like many people living in cold climates, the Finns are not too fond of fresh air. Food is poor. The peasantry, however, are on the whole strong and healthy.

Rye bread is the commonest food of the peasant. It is often only baked twice a year and is very tough, even when

fresh. The loaves are round, hard, and flat, looking like quoits, and they are slung on a pole in the roof for storage. The Finn likes his bread sour, and considers ordinary bread to be tasteless. Porridge is also much eaten. Coffee is universally drunk, and is excellent. Fish is much more common than meat and is eaten in many forms. Raw smoked salmon and salt fish are very popular.

The vapour bath, which the whole family often takes together, is among the most characteristic institutions of the country. It is even suggested that it may have a ritual origin, the bathing-house having at one time been a temple and the old bathing-woman, who beats the bathers with her twigs, the priestess. This may also explain the Finns' indifference to being seen naked when bathing. Bathing is regarded as a sovereign cure in cases of illness, and women in child-birth are taken to the bath-house, which is heated to as high a degree as the mother can bear, to be delivered. 'If the bath-house and brandy can't help a man, death is near at hand,' says a proverb. In towns, of course, the bath, though just as regular an institution, loses much of its peculiar character.

Marriage and Funeral Customs

A man may marry at 18 and a woman at 15, but they must prove that they are of legal age and that the man needs a wife. There is no civil marriage, but the attitude of the clergy towards Russia has made them so unpopular in Finland that marriage in church is falling into disfavour. Advanced people now merely insert a notice in the press stating that they are married and they are recognized everywhere, as are their children.

Funerals are very simple, especially among the poor. Professional wailers still come to sing the corpse-song in many places. As usual, customs differ in different districts. The corpse is laid in an out-house for twelve days. On the fourth it is placed before the door and the relatives come to bid it farewell. In remote districts the coffin is often lowered into the grave a fortnight before the service is read so as to give

the relatives time to assemble. On the following Sunday special prayers are offered. Sweetmeats tied up in crape are distributed on these occasions. If the deceased is a person of importance, enormous quantities are sometimes required.

Dress

The male peasants now wear ordinary hats or caps. The vest is usually red, to which colour the Finns, like most northern nations, are greatly attached. In their leather belts boys and men carry the *punkko*, a formidable knife encased in an ornamented sheath. This knife is quickly drawn in a quarrel. The *mekko*, or linen blouse, theoretically white, is commonly worn. The women usually wear black once their girlhood is passed, and the Sunday clothes are black also. Young girls wear bright colours, as do older women with more progressive ideas. Girls tie their hair with a black or red ribbon, either cutting it short or letting it fall about their shoulders. Married women cover their hair, generally with a handkerchief. Their usual costume is a short jacket, a close-fitting bodice, and a woollen skirt edged with red, blue, or green.

Superstitions and Customs

Finland is curiously rich in old customs and beliefs, as she derives her stock from Scandinavian, as well as from Finnish sources. Living people have seen the Lady of the Forest, and also mermåids, and have been helped or hindered in their work by little old men. Witches travel in sand-eddies. Cows are ridden by nightmares and a knife must be driven into the stable wall above them, or a hole made in the threshold and quicksilver placed in it. Squirrels building near a house or the loss of a tooth signify death. Any one born during Mass on Sunday can see spirits. A man who wears his hat well back will be kind to his wife. And there are many other such beliefs. Charms are still used to cure illness or to bring luck in every conceivable way, and the evil eye is still dreaded. The Finns are passionately fond of riddles, and the old people especially will while away the long winter evenings by asking

them, often sitting hand in hand in the dark. The peasant also possesses an inexhaustible store of proverbs.

The harvest-home is a great festival with much dancing. Many of the peasants dance excellently. *Kokko* fires are lighted on hill-tops and on islands in the lakes on Midsummer Eve. Easter and Christmas have their special dishes. Christmas is elaborately celebrated, as in all northern countries. Lead is melted and thrown into cold water, omens being gathered from the shape it takes. Black spots in it forbode death. On All Saints' Day servants, who are engaged for a year, renew their contracts or give notice. Fires are also made at Whitsuntide to celebrate the return of warmth and the peasants sing runes so old that in places the very meaning of the words has long been forgotten. At Easter there is much swinging, which may be a survival of an expiatory swinging festival, like the Aeora of ancient Athens. We read of elaborate ritual swinging at Easter in some parts of modern Greece and of something of the same kind in Korea.

Drink Question

Even before Russia's drastic prohibition during the war, the Finns were, on paper, the most sober nation in the world. Every community had the right to veto both bars and the retail liquor trade. In some cases the monopoly of the liquor trade is given to limited companies, the profits being used for municipal purposes. The sale of alcoholic drink is prohibited in the rural districts and in several towns drink is only served if a customer also takes food. But the Diet's proposal to forbid the sale of alcohol altogether throughout the country was vetoed by the Tsar with the general approval of the Finns themselves. One hears rumours of smuggling and of illicit stills in the forests, and the Finns do not strike the ordinary traveller as remarkably sober.

Public Health

The most prevalent disease in Finland is malaria, which is endemic, but as a rule occurs in a mild form and is not

dangerous. The conditions in the country are ideal for mosquitoes, which carry the disease. Malaria sometimes assumes the proportions of an epidemic and it has been noticed that each successive epidemic carries the disease further north, so that it is gradually gaining ground, particularly on the low coast regions of the Gulf of Bothnia. It is now found as far north as Uleåborg. Smallpox dates from long back, but is now, as elsewhere in Western Europe, being stamped out. By 1890 vaccination was made compulsory throughout Finland, and in 1893 the provision of pure lymph gave Finland the full benefit of the enactment. In the previous decade the mortality from small-pox was 9·3 per cent. It is now ·09 per cent.

Cholera is not endemic in Finland, but used to spread from Russia during epidemics in that country and cause great mortality. However, during the last epidemics in Petrograd, in 1892–4 and 1908–10, the disease was prevented from reaching Finland by careful supervision of all passengers and the immediate isolation of all suspects. The preventive measures were so well organized that Finland in the years mentioned had only a few insignificant outbreaks which were easily localized and stamped out. In July 1910 there were 4,000 cases in Petrograd, but Finland had only 7 cases, all of which were imported from Russia. As there was no interruption of traffic between Finland and Russia, this immunity was entirely due to the excellence of the preventive measures adopted in Finland.

The ravages of pulmonary tuberculosis or consumption are particularly great along the coasts of the Gulf of Bothnia and in the river valleys of the north, but the interior of the country suffers also. The Åland Islands are comparatively free. From 1898 to 1907 about one-third of the annual total of deaths was due to tuberculosis. Several sanatoria are now established and other preventive measures are being taken, but the disease has still a strong hold on the population.

Syphilis seems to date from about two centuries ago in Finland and used to be very prevalent. It is now decreasing

to some extent. Blindness used to be a common infirmity, and 30 per cent. of the cases were due to trachoma, in the propagation of which want of cleanliness is an important factor. More than half the cases are in people over 60 years of age. There are state schools for the blind at Helsingfors and Kuopio. The number of deaf mutes is about 8 per 10,000 and shows no signs of decreasing. There are two state schools for Swedish deaf mutes and five for Finns. At Helsingfors there is a school of instruction for cripples, where they are taught various trades.

Lunacy is somewhat prevalent, and is said, but perhaps erroneously, to be due only to a small extent to syphilis and alcohol. In 1906 there were 4 lunatics per 1,000 of the population, and in addition about a quarter that number of idiots. There are asylums and homes throughout Finland Epilepsy is common. There is one epileptic in every 1,000 inhabitants on an average, but accurate statistics are lacking The tendency towards suicide seems to be widespread and on the increase in Finland. In 1907 there were 7 suicides per 1,000 inhabitants, and as usual the act was commonest in spring.

There are state-paid physicians throughout Finland charged with preventive and combative measures against disease, the supervision of vaccination, &c. The towns have also medical men on the municipal staff. In addition there are private practitioners in the most populated parts. In 1910 there was a total of 524 medical men in Finland. In each government there is a provincial hospital and there are general hospitals in all the large towns, as well as numerous specialized ones. The State contributes to practically all hospitals in addition to those which it supports solely. All the government hospitals are in close relationship with the University of Helsingfors for the training of medical students.

CHAPTER VI

HISTORY, POLITICAL CONDITIONS, AND ADMINISTRATION

History and Constitution—Administration—Administrative Departments—Local Administration.

History and Constitution

The Finns are generally thought to have taken possession of their present home at the end of the seventh or beginning of the eighth century. Before their advent Finland was probably inhabited by Lapps, though there are indications of an earlier Scandinavian occupation of the country. At this time the Finns appear to have lived in separate, independent communities; but they were brave warriors and troublesome neighbours, making frequent raids on the Swedish coast. Not till 1157 did King Eric of Sweden, with Henry, the English Bishop of Uppsala, lead a crusade for the conversion and conquest of the country. Bishop Henry was left behind to complete the conversion of the natives, but was martyred by them. He was subsequently canonized and is now the patron saint of Finland. Sweden, however, did not maintain her hold on the country. It was rapidly returning to its former state, when another Englishman, Bishop Thomas, arrived to continue St. Henry's work in 1209. So successful was he that he nearly managed to establish Finland as a separate province owing allegiance to the Pope alone. In 1249 Birger Jarl carried his sword and the cross to Tavastehus, where he built a castle Karelia was brought under subjection in 1293 and another strong castle built at Viborg. Finally in 1323 the Rajajoki was established as the frontier between Russia and Sweden.

Swedish conquest

Finland was doomed by her geographical position to be a bone of contention between Sweden and Russia. Indeed, her entire history has been shaped by this circumstance. On the whole she was fortunate in falling into the hands of Sweden first. Russian civilization at that time was not very much superior to that of the Finns themselves. A Russian invasion would have destroyed their individuality, if it had not ended in their complete extermination. The Swedes, however, were not numerous enough to overrun the whole country. They spread slowly along the coast east and north of Åbo, but they turned the face of Finland definitely towards the west, thereby alienating her for ever from the eastern tendencies that characterize Russia. Though socially and politically, as well as in their religion, the Finns became part of Scandinavia, they never lost their nationality, clinging obstinately to their language, their songs and their folk-lore. This is not surprising when it is remembered that the country was cut off from the rest of the world for half the year.

Finland became, however, an integral part of the Scandinavian kingdom and the Finns enjoyed exactly the same privileges and the same constitutional rights as the Swedes. The reformed religion was introduced into the country about 1528. Yet Finland stood to some extent apart. Till the end of the eighteenth century hardly a generation escaped the ravages of fire and sword during the endless wars with Russia, and the defence of the country was generally left to the native troops. Towards the end of the sixteenth century John III made Finland a Grand Duchy and early in the next century Gustavus Adolphus gave her a Diet of four orders, nobles, clergy, burghers and peasants, besides lavishly encouraging education and learning. During the last decade of the century famine and pestilence played havoc in the country. In the diocese of Åbo 60,000 persons died in less than nine months. Finland has often suffered from similar

scourges, the defective means of communication making it difficult to relieve the outlying stricken districts. Even in 1848 whole villages starved during a severe famine.

Russian conquest

Hitherto Russia had remained a land power. Peter the Great first turned her ambitions towards the sea. When he founded Petrograd and declared 'It is water I want, not land', Finland's doom was sealed. A change of masters was only a question of time. By 1716 he had overrun the whole country and the Peace of Nystad (1721) gave him the province of Viborg and the coveted footing on the Baltic. Sweden's attempts to recover the lost province in 1741 resulted in the peace of Åbo (1743) when the Kyminjoki became the frontier. Under Gustavus III Finland began to prosper again. Not only did he confirm the 'fundamental laws' and the Finnish constitution, but he reformed the administration, built new towns and encouraged trade, science and art. He also made Swedish the official language instead of Latin. Between 1788–90 Russia and Sweden carried on a desultory and indecisive war.

The Constitution

The treaty of Tilsit gave the Tsar Alexander I a free hand in Finland. The invasion began in February of the next year and a month later Åbo fell, the weak Swedish king having ordered his army to retire after a show of resistance. But though thus basely deserted, the Finns fought bravely in the north. Two-thirds of the country was still in their hands at the end of the year, and this heroic conduct had much to do with the nature of the ultimate settlement In 1742 the Empress Elizabeth and after her Catherine the Great made offers to leading Finnish statesmen for a union of Finland with Russia, the independence of the country being guaranteed by the Tsars. Sprengtporten, whose influence at Petrograd was invaluable to his country at this time, had himself

intrigued with Catherine the Great in his younger days. When, therefore, the Tsar proposed that a deputation should be sent to Petrograd to discuss terms of settlement it was clear that these would be highly favourable to the Finns, while their treatment by the Swedes was not such as to make them likely to reject them. Alexander took care to be fully informed about the details of the constitution, as there is ample evidence to show, though Russian writers attempt to deny it. On March 15/27, 1809, he signed the Act of Assurance, guaranteeing the Finnish Constitution, at Borgå, and two days later solemnly took the oath to it in the cathedral, after which (a very important point) he received the homage of his new subjects. From that day, constitutionally, Finland became an autonomous Grand Duchy with the Tsar as Grand Duke, while diplomatically she was merged in Russia. The Åland Islands, being part of Finland, were included in the Grand Duchy.

The Diet of 1809, which was opened by Alexander I in person, marks the turning-point in Finnish history. It is true that between 1809 and 1863 no Diet was summoned, but by the constitution a Diet need only be convoked when legislation is necessary and both the Finns and their new rulers tacitly agreed that no new laws were required. What the country wanted was rest and time to recover from the effects of the wars of the previous century. The population was then only about a million. The mutual confidence that prevailed between both parties to the treaty of Åbo is proved by the fact that in 1812 Petrograd itself was garrisoned by three Finnish regiments, all the Russian troops being thus released to fight against Napoleon. The country was administered by a Finnish Secretary of State and a committee of Finlanders, created at the Tsar's own desire in 1811, to help him in matters which had to emanate from his own initiative and not from that of the Diet. In the same year he restored Viborg to the Grand Duchy of Finland. The great ability of the successive Finnish Secretaries of State was for many years a priceless boon to their country.

Rights respected

The new Tsar Nicholas took the oath to the constitution in 1825, autocrat though he was. The Finnish committee was abolished, but at the same time the fundamental laws were again confirmed. The only result of the change was to strengthen the hands of the Finnish Secretary of State. Nicholas always respected his oath and on several occasions, when certain kinds of questions came up for discussion, he left them in abeyance because there was no Diet to deal with them and they were outside his own province.

Alexander II also took the oath to the constitution. His inclinations were distinctly liberal and he is held in peculiar affection by the Finns to this day. By this time Finland had recovered and was beginning to make rapid progress. She had, in fact, outgrown the existing system, and changes were necessary. The Tsar recognized this and summoned a Diet in 1863, which he opened in person, confirming the fundamental laws in his speech. The Diet itself, which met again in 1867, was made much more representative, and a number of urgent legislative reforms were introduced. The Diet was now regularly summoned and from this time Finland may be said to have enjoyed full constitutional rights. Indeed, it is clear that Alexander II recognized that the principle of constitutional monarchy is inherent in the institutions of Finland, and is not a boon conferred upon her by the Tsars. Secondly, he recognized the separate existence of the Grand Duchy of Finland. Thirdly, he admitted the absolute right of the Diet to deal with certain questions as it thought fit. In spite of the opposition of the nationalist party, he definitely conceded the right of Finland to settle her own army in her own way and to officer it with Finns. From this time begins the rapid economic and intellectual development of the country, which seemed to spring into a new life on being thus freed from the old fetters. The fundamental laws were also confirmed by the next Tsar, Alexander III, though he too was a reactionary. Since 1882 the Diet has met triennially.

The language question

Meanwhile the important language question had rapidly been reaching an acute stage. Swedish had long been the official and literary tongue throughout the Grand Duchy, where the Swedes lived apart as a superior class. If a Finn wished to be educated he must adopt the official language and virtually become a Swede. His mother tongue was useless for such a purpose. After the union with Russia Swedish remained the official language, though Finnish was allowed in the courts. 'We are not Swedes, we don't want to become Russians, let us then be Finns,' sums up the attitude of the new movement. This attitude was denounced as Fennomania by the Swedish element, which looked with contempt upon the Finns. The result was the formation of two parties, the Fennoman and Svecoman, which waged unceasing war upon each other in the Diet and elsewhere till they were driven into each other's arms by the gravity of the danger from Russia. Elias Lönnrot, to whom we owe the preservation of the *Kalevala*, the national epic of Finland, the poet Runeberg, though he wrote in Swedish, and above all Snellman, with the rest of the able young men who founded the Finnish Literary Society, were the leaders of the new movement. They did not wish to do away with Swedish, for they fully realized its educational value, but they saw that the only way to raise the people was to put the Finnish language on a level with Swedish. It was, however, clear that Finnish must first be remodelled and developed. This was gradually done, and in 1863 Alexander II granted a decree equalizing the two languages just after opening the new Diet. The Swedes have consistently opposed the progress of the Finnish tongue with the utmost bitterness step by step, but they are clearly fighting a losing battle. Finnish is rapidly replacing Swedish throughout the country, where 90 per cent. of the people speak it, and the Swedish element is withdrawing more and more from public life. In 1883 a decree ordained that all notices should be posted in the

language generally used in the different communes, and in 1887 this regulation was extended to official correspondence But it is only a few fanatics who would like to see Swedish abolished altogether. All reasonable people fully realize its educational value. It must be admitted that with all its disadvantages the struggle has introduced a healthy competition into public life. Though the Finnish element had a clear majority in the country, the restricted franchise kept it in a minority in the Diet and the Svecomans taunt it with getting the new ordinances introduced by the help of Russia. At times even the Russian peril was not able to prevent the old feud from breaking out again, but the bitter feeling seems to have largely spent itself in the younger generation, which had to face the vital question of the preservation of national independence from Russian aggression.

The Reaction

Meanwhile the Slavophil party in Russia, with its ideal of 'one law, one church, one tongue', was feeling its way. Russian writers began to attack the Finnish constitution in the eighties. Then in June 1890 a manifesto was issued subordinating the Finnish post office to the Russian ministry. Other ordinances soon followed, all tending in a similar direction.

In 1899 General Bobrikoff, the governor of Finland, brought a measure before the Diet abolishing the separate army of Finland and merging it in the Russian army, at the same time denying the Diet's right to amend or reject the measure. Foreseeing opposition, Bobrikoff then produced the famous 'February manifesto' signed by the Tsar. In this decree the Tsar reserved to himself the right to distinguish between questions of imperial and questions of local interest and to withdraw the former altogether from the sphere of the Diet. By a majority of 10 votes to 9 the Senate decided to publish the manifesto and protest. But neither their protest nor the monster national petition that followed it, reached the Tsar. Though the constitution was thus virtually abolished, at first it proved quite impossible to put the military law into force.

Twelve of the senators resigned and a great cleavage in Finnish opinion was the result. One group of officials held it to be a violation of their oath to support Russian-made law; the other considered that by retaining office and not adopting a too uncompromising attitude they might hope to conciliate Russia, which would not go beyond a certain point. The former were the Finnish party, and its attitude so disgusted many of its supporters that they formed a new party, the Young Finns, who vigorously opposed the policy of the Old Finns. The governor replaced many of the resigning officials by Russians, whom he protected against the jurisdiction of the Finnish courts. Numbers of spies were introduced, and attempts were made to Russify the national education. Many prominent Finns were banished. Such was the pressure applied that at last even Finland began to show signs of yielding. The number of conscripts came nearer the legal requirements every year, and in 1904 it reached four-fifths of those demanded. Then in June Bobrikoff was shot by Eugene Schauman, a student, who shot himself immediately afterwards. The new governor slightly relaxed his grip. The granting of a Duma to Russia was followed by a general strike in Finland, which lasted six days and was so successful that on November 17, 1905, the Tsar restored the constitution. But it is noteworthy that the socialists wished to continue the strike as a class struggle in the hope of obtaining social reforms.

The new constitution

The new Diet or Landtag immediately reformed itself drastically. It now consists of 200 members elected every three years on the system of proportional representation devised by d'Hondt. The member for Lapland alone is elected by a bare majority. Every man or woman over 24 can vote and is eligible to the Diet, which meets annually, the sessions lasting 90 days. The Tsar, however, could dissolve it (and he did so frequently of recent years) or call extraordinary meetings. Finnish and Swedish are on a footing of absolute equality there. It is generally admitted that the presence

of women, very few of whom are active politicians, has been beneficial in the Diet, and that their possession of the franchise has not tended to give them a distaste for domestic life. In the 1916 Diet 24 members, 12 per cent. of the whole, were women.

The Tsar nominated the members of the Senate for three years, though their term of office might be extended. The Senate is divided into two parts, the Department of Justice, which is the supreme court of Finland and contains 10 members, and the Department of Economy, containing the heads of the administrative departments, who are 10 or 12 in number. According to the constitution it should consist only of Finns, but in 1912 a Russian was introduced into the administrative side. The Senate only meets as a whole to give an opinion on the Diet's measures, or to elaborate bills for the Diet. The Governor-General presided. The Senate is not responsible to the Diet.

By the constitution both the Tsar and the Diet have power to initiate legislation. The Diet has no such rights as regards the fundamental laws and the question of national defence, but it can petition for legislation in these spheres. Ordinary expenditure is regulated by the Grand Duke, but changes in taxation must be sanctioned by the Diet. Only in war time can he raise taxes on his own initiative.

Reaction again

Finland did not enjoy a long respite. On the advice of Count Witte the Finnish question was left to the Duma. The regulations of June 1908, proposed by the Council of Ministers and sanctioned by the Tsar, virtually gave that body complete control of Finnish legislation, since the elastic expression 'common interests' allowed it to treat anything it chose as a concern of the Empire as a whole. The Diet was, in fact, to be reduced to the level of a County Council. The arrangement by which Finland was to contribute money instead of men to the army was made permanent by the Duma in 1912. This measure was not brought before the

Diet, which would gladly have accepted it, as such a step would have looked like acknowledging its rights. The history of Finland during the years before the revolution was simply a record of steady encroachment by the nationalist Duma instead of by the Tsar.

Russians and Finns lived entirely apart, their social relations much resembling those of the Italians and Austrians in Lombardy after 1848.

Finland and the European War

In November 1914 the Tsar issued the 'November programme', which ordained the maintenance of Russian authority and public order at all costs. The press was drastically censored, public meetings were disallowed, while Russian was, as far as possible, made the language of university instruction. The Finns were not forced to fight, but a number of the most prominent patriots among them were exiled to Siberia. At first Finland had favoured the Entente, trusting that Great Britain might compel Russia to grant her some kind of autonomy. But the November programme shattered these hopes, and by 1915 the majority of the educated Finns were pro-German, or at least anti-Russian in feeling. Germans set about organizing a Finnish legion, which had only moderate success. The recruits were not sent to the front, but kept in Germany on the chance of their proving useful in Finland itself. The elections to the Diet of 1916 reflect the state of feeling in the country. The socialists rose from 80 to 103, thus obtaining an absolute majority. There were 33 Old Finns, 23 Young Finns, 21 Swedes and 16 Agrarians. The Agrarians increased rapidly, because the peasants' real grievances had been thrown into the background by the political situation.

The Russian Revolution

The Russian revolution of March 1917, which restored the constitution, was received with great enthusiasm in Finland. But difficulties soon arose. The Finns maintained that the only tie which bound them to Russia was the monarchy,

and that this had been dissolved by the Tsar's abdication. Kerensky, on the other hand, was willing to give the Grand Duchy the widest measure of internal autonomy, but insisted on Russia's right to control foreign relations and military matters, and maintained that the Constituent Assembly alone had the power to transfer the Tsar's functions to the Economic Committee of the Senate, as the Finns desired. Meanwhile social unrest, aggravated by the food shortage, increased rapidly. Strikes of workmen demanding enormous increases of wages were everywhere common and the Soldiers' and Workmen's Committees obtained more and more power.

On July 19 the Diet declared its independence except in military matters and in foreign relations, by a large majority, and refused to submit the bill to Russia. The old Diet was dissolved. The new elections gave the Socialists 95 seats, the unified Bourgeois Block 65, the Swedish Party 18, and the Agrarians 22. Not till they found that they could count on the Agrarian vote did the Socialists recognize this Diet. On October 7 Finland declared itself a Republic within Russia.

The Bolsheviks

Then came the Bolshevik revolution in Russia. On December 9 the Finnish Diet declared its complete independence by 106 votes to 90, and on the 22nd it arrogated to itself the powers of the Tsar. Finland's independence was recognized by Russia, Sweden, Norway, France, Spain, Denmark, and Germany, on the understanding that Finland came to an agreement with Russia about formal separation. Bolshevism was rapidly spreading through the country, and various drastic social measures were carried at the same time. The Russian troops sided with the Finnish Bolsheviks, and together they were guilty of a number of outrages.

By January 1918 the country was definitely divided between the Red and the White Guards. The Reds, with their capital at Viborg, dominated the south and were supported by the Russian Bolsheviks. The Whites, the bourgeois party, were led by General Mannerheim, who made

Vasa his capital. A civil war ensued which was also a class war. The Red Guards adopted the methods of the Russian Bolsheviks. Private property was seized, all the machinery of the law was abolished and at least 1,000 innocent persons were murdered. Though the Reds were more numerous and better armed, General Mannerheim's skill enabled him rapidly to gain control of the railways of the north and the ports of the Gulf of Bothnia. The 1,000 Finnish volunteers who had been trained in Germany joined him and formed the backbone of his army. There is little doubt that he could have ended the war without German aid, had he been allowed to do so, as he wished, though the Swedish Government discouraged the Swedish volunteers from joining him and refused to countenance his being supplied with arms from Sweden.

The Åland Islands.

In January 1918 the Åland Islands had petitioned Sweden for protection against the Russian garrison, and Swedish ships were sent to remove the Russians, who raised no objections. Meanwhile on February 28, the White Guards in Finland officially requested Germany to help them, and five days later an expedition landed on the Åland Islands. The commander declared that Germany had no desire for conquest but meant to use them merely as a base against Finland. On March 13 the islanders petitioned the King of Sweden to allow them to unite with Sweden, or at least to support their claim to the right of self-determination at the Peace Conference. Sweden would make no promise. During April Sweden evacuated the islands, except for a small guard over Russian property, but declared that she did so without prejudice to her rights. In June Sweden, Germany, and Finland began negotiations for the destruction of the forts upon the islands.[1]

[1] The Åland Islands were seized by the British fleet in 1854 during the war with Russia and were restored in 1856 with the stipulation that they should not be fortified. This stipulation was respected till the winter of 1914–15, when Russia began actively to fortify the islands and construct a naval base, thereby causing much uneasiness in Sweden.

There was great indignation among the islanders, who are virtually all Swedes, that the garrison sent from Finland consisted entirely of Finns, and greater still that they were not exempted from the Finnish conscription bill, which made all men and women between 18 and 56 liable to agricultural or defence work on behalf of their country.

German Intervention

A treaty between Germany and Finland was signed on March 7, 1918. Germany recognized Finland's independence and undertook to induce the other Powers to do the same. Finland will cede none of her territories without first coming to an agreement with Russia. There shall be no war indemnities; commercial relations and the payment of public obligations shall be resumed as soon as possible, prisoners of war shall be exchanged and the fate of the Åland Islands shall be settled with Russia and Sweden. The economic treaty, signed two days later, virtually gave the two peoples reciprocal trading rights in each other's countries. Such a treaty was clearly all to the advantage of a powerfully organized country like Germany. It created great indignation in Finland when published.

On March 2 a treaty was also signed between Russia and Finland, establishing friendly relations between them and making arrangements for a commercial understanding. But the delegates of the two countries failed subsequently to come to an agreement.

On April 3 a force of 12,000 Germans landed at Hangö and Lovisa. They took Helsingfors after three days' fighting, and by May 5 the whole country was in White, or rather German, hands. Swinhuvfud was made Dictator in accordance with the provisions of the Constitution of 1772 for cases of emergency. A former President of the Diet, he had been exiled to Siberia in the early days of the war, but had been brought back to Finland by Kerensky himself. He had represented the Whites in Berlin, where he is said to have advanced Finland's claim to Eastern Karelia as far as the White Sea,

including a section of the Murman railway, on the ground that the majority of the inhabitants are Finns.

The Rule of the Whites

Finland thus definitely threw in her lot with the Central Powers, since she could obtain help and food from no other source. The inability or unwillingness of the Entente to supply her with provisions is said to have created bitter disappointment. Sweden's refusal to assist her in putting down the revolution aroused much indignation, and there has been a pronounced revival of the Fenoman movement against all things Swedish in consequence. The Finns justified their attitude towards Germany on the ground that in her lay their one hope of protection against a revived Russia.

The Whites at once began to take strong measures against the Social Democrats. All the socialists, with one exception, have been excluded from the Diet. The 80,000 Red Guard prisoners were concentrated in six camps, where they were by no means well treated, although it was maintained by the White Government that the food, if wholly insufficient, was not worse than that of the rest of the population. Executions have been numerous. The press is rigorously censored. Socialist papers have been altogether suppressed and socialist libraries destroyed. Even socialists who took no part in the revolution have been persecuted. For a time something approaching a White Terror seems to have prevailed, which aroused the bitter hatred of the working classes. But by the end of August the prisoners were handed over to the civil authorities and those less seriously implicated were released, though still kept under police supervision.

The Monarchy

The new senate cantained 6 Young Finns, 5 Old Finns, 2 Agrarians, 1 Swede, and 1 Socialist. On August 9 the monarchy bill was passed, but without obtaining the necessary five-sixths majority owing to the opposition of the Agrarians. The 90 Socialists were, of course, excluded. So the Swedish

constitution of 1772, which empowers a bare majority to alter the constitution, was revived and on October 9 Prince Friedrich Karl of Hesse was elected king. France refused to recognize the election, since the existing régime had been forced upon the country 'illegally and by force'; and in no circumstances would she recognize a sovereign from a belligerent nation. Great Britain took up a similar attitude. The Finnish Govermnent held that only a monarch could give the nation strength to resist Bolshevism. Since the German defeat Prince Friedrich Karl has declined the throne.

Recent Developments

Swinhufvud's government rapidly lost influence. It had alienated Scandinavia and failed to come to an understanding with Bolshevism or to solve domestic questions. Its adventurous foreign policy accounted for much of the unpopularity of military service in Finland. The Karelians showed clearly that they were not enthusiastically in favour of union with Finland and on September 18, 1918, German-led Finnish forces were defeated near Ukhtinskaya, and Karelia was cleared of them.

After the defeat of Germany a new government was formed, consisting of 7 Monarchists and 6 Republicans. The Agrarians refuse to support it, since the Republicans are in a minority, and the Socialists demand fresh elections. Its aims are to maintain strict neutrality, to secure the recognition of Finnish independence, if possible before the Peace Conference, to preserve territorial integrity (i.e. to keep the Åland Islands) and to hold free elections as soon as the state of the country makes it possible. In December 1918 General Mannerheim, who had resigned his command as a protest against German officers being called in to train the Finnish army, accepted the post of Regent.

ADMINISTRATION

The Senate is the head of the administrative side of the government. The administrative branch of the Senate, con-

sisting of 10 to 12 members, contains the heads of the following departments : Justice, Interior, Finance, Surveying of Taxes and Public Lands, Religion and Education, Agriculture, Communications, Trade and Industry. The Vice-President of the Senate is in charge of the general chancellery of the department. The Governor-General is President of the Senate, acting as intermediary between that body and the Tsar or the Finnish Secretary of State.

The Tsar appointed the higher officials, the Senate the others.

Administration of Justice

The Urban Tribunal (*rådhusrätt*), consisting of the burgomaster and two or more aldermen, is the court of first instance.

The rural districts are divided into 62 jurisdictions, each containing from 2 to 7 judicial districts. There is a single judge for each of these jurisdictions. The district tribunal consists of the judge and at least 5 councillors chosen from among the landed proprietors of the district. The tribunal sits twice a year in each district, but extraordinary sessions can be summoned.

There are three courts of appeal, composed of a President, a Vice-President and at least 15 members. They do their work in sections. Five members make a quorum in a section.

The Judicial Department of the Senate acts as a supreme Court of Appeal, but also performs functions which properly belong to a Ministry of Justice. A strong desire existed to separate the Department of Justice from the rest of the Senate and make it into an independent Supreme Court. The fact that its members were appointed by the Tsar largely for political reasons and for a short period only was a serious source of weakness to the department. It was also desired to remove from the Department all business of an administrative character.

The Procurator is the legal adviser of the Senate. His business is to see that officials do not transgress the laws.

Administrative Departments

The central administrative departments are under the direct control of the Senate. Some of them are organized as deliberative bodies, their decisions being given by a majority of votes. Others are organized on a bureaucratic basis, the decision resting with the head of the department.

For local administration Finland is divided into eight provinces, which are named as follows, after their chief towns: Åbo and Björneborg with the Åland Islands, Nyland, Tavastehus, Viborg, St. Michel, Kuopio, Vasa, Uleåborg. The governor of the province is the head of the local administration. The subordinate officials, who prepare business and draw up reports, have only a consultative power. The provinces are divided into districts for administrative purposes. These are also divided, the divisions generally coinciding with those of the rural communes.

For ordinary purposes of reference the people of the country use the ten old divisions and not the ones above enumerated. These old divisions are: Åland Islands, Old Finland, Nyland, Tavastland, Satakunta, Karelia, Savolaks, Österbotten, Vesterbotten, and Lapland.

Local Administration

The country is divided into 38 urban and 475 rural communes. They can manage virtually all their own affairs—finance, the communal properties, poor law administration, public health, and police. But decisions on some matters, such as police and the raising of loans, must be ratified by the governor of the province or the Senate. Primary schools also must be organized on the authorized pattern.

The right to vote depends on the amount paid in taxation, and a man may have up to 25 votes according to his income. Married women do not possess the communal vote, since their husbands pay the taxes. But when the political horizon clears the elections will probably be reformed on the one man one vote principle of the Diet, and women also will be given the vote.

Towns of over 2,000 inhabitants elect representatives and smaller communes may do so if they choose. The amount of taxation is fixed for 3 or 5 years by a general meeting of the electors. This general assembly also elects the municipal councillors, the finance board, and the surveyors of taxes. Councillors are elected for three years, one-third of them retiring annually by rotation.

The municipal court of the mayor and aldermen also acts as the executive body of the town council, advising it as to the legality of its decisions.

The rural communes have no such court. The ultimate decision on all questions rests with the general assembly. The communal council acts as the executive of the rural communes.

CHAPTER VII

RESOURCES AND INDUSTRIES

Forestry—Agriculture—Fisheries—Mineral Resources—Building Stone—Manufacturing Industries—Water power

Forestry

Of the natural productions of Finland timber is by far the most important. In one form or another it is the leading source of activity and industrial development, and the principal export. Timber means more in proportion to her total resources to Finland than to any other country. The forests, besides producing logs, deals, battens, and boards, provide firewood, charcoal, tar-barrels, fencing, hoops, laths, shingles, potash, tar, and other products. 'Birch leaves provide fodder for cattle, birch twigs are used for brooms and bath massage, fir branches form a mat at every door, split saplings constitute the only field fencing, rough-hewn logs, dovetailed, compose many a house, and birch blocks are to this day the principal fuel for locomotive and hearth, while twine is made from roots.' Over 63 per cent. of Finland is now covered with timber, but originally the whole was forested. In the early days the forests were used only for hunting, but as the nomadic hunters settled around the lakes they utilized the trees for building and for firewood. Then gradually, as hunting decreased in favour of agriculture, the peasants took to burning the forests in order to clear and fertilize the soil. Much forest was thus destroyed and turned into arable land (see p. 100).

It was, however, only when the growing demand for timber in the southern and western countries of Europe stimulated an export trade, that Finland awoke to a realization of her latent forest riches. Now the most modern machinery, worked by electric power in most cases, is used throughout the country, even in the remotest parts. The first result of the modern

demand for timber, and one that still prevails in parts, was indiscriminate and reckless exploitation with no attempt at planting to replace the fallen trees. This led to the destruction of vast areas of forest, which can be regrown only slowly and with difficulty. The destruction was greatest in the coastal regions of Österbotten and around the Saima chain of lakes. The forests of the interior naturally escaped. State intervention did much to stop this wholesale deforestation and to conserve the timber resources of the country. By the middle of the nineteenth century scientific forestry was begun, and the forests were divided into a number of districts, each under the care of a forester. In 1863 a Government department of forests was instituted. The tasks it had to face were great, but progress has been steady from year to year, even if there is still scope for improvement in the administration and care of the forests. The State now owns about one-third of the total area of Finland; 14 million acres of this are valuable forest land and about 16 million acres are marsh land with trees. About 90 per cent. of the State-owned forests are north of lat. 64° N., but in recent years the State has been increasing its holdings in the south by purchase. The forests are divided for supervision into eight divisions and eighty-one districts. Foresters are trained in schools of forestry. The State sells the standing timber, either by area or by trunks, and the felling is done by the purchaser. Thus in State forests the number of trees felled is carefully regulated. Moreover, the State is taking measures to reclaim and afforest several areas of marshy ground. In some cases the forest department grants concessions for a term of years to cut a maximum number of logs. Over 25 million acres of forest are privately owned, and in these the rate of destruction is still too great. A law to the effect that a proprietor when he cuts over 12 acres must take measures to assure its re-afforestation is a dead letter, and there are no real restrictions which prevent excessive exploitation. The care of private or communal forests is left entirely to the discretion of the owners. The annual diminution in the size of trees

exported is testimony to the gradual decrease of the forest wealth of Finland. Though indiscriminate exploitation is responsible for the worst havoc, there are other destructive factors at work. In Lapland reindeer browsing on the trees do them much harm, and the Lapps are in the habit of cutting off the tops of young trees for reindeer fodder. Accidental fires occur from time to time. Despite all precautions, over 100,000 acres of forest were destroyed by fire in 1894, and the same extent of damage was done in 1883. Lastly, the great and growing demand for pit props is having a most harmful effect on the forests, as it entails the destruction of young trees, to get timber of the right size and toughness.

The annual growth of timber in Finland has been estimated at 35,000,000 cubic metres and the annual cutting at 37,000,000, leaving a yearly decrease of 2,000,000 cubic metres in the forest resources of the country.

The principal forest-trees have been mentioned in Chapter IV Of these the pine, spruce or fir, and birch are of greatest economic importance. The methods of the timber industry are largely determined by the physical conditions of the country. In autumn the woodmen migrate from the lake-side and river-side villages into the forest, and erect small, primitive huts. As soon as the snow falls, felling begins, for the snow gives a surface over which the timber can be dragged to the river-side. The barked and rough-hewn logs are stacked on the banks of the nearest waterway. In spring, on the break-up of the river, the logs are floated down stream. In the narrows and rapids the logs often jam and can be dislodged only with difficulty and often danger. Men are generally stationed on the banks of the narrows to guide the logs through, but sometimes resort has to be had to dynamite to clear away a block of timber. In the lakes, of course, artificial traction has to be used. The logs are marshalled into great rafts on which the lumbermen construct their living huts. In former times these rafts were slowly kedged along the lakes, but now they are drawn by tugs. Progress, however, is slow, and it may take two or even three summers for a log to make the journey

from the forest to the saw-mill near the coast, especially if alternations of lake and river necessitate the frequent making and unmaking of rafts.

Most of the saw-mills, since they depend on water power, are at the falls of the rivers on their courses over the coastal plains. In 1914 there were 1,000 saw-mills in Finland, of which the larger ones were at or near the mouths of the principal rivers, Kyminjoki, Kokemäenjoki (Kumo), Vuoksi, Kemijoki, Tornionjoki, and the Saima canal. And so the principal timber ports came to be places like Viborg, Kotka, and Björneborg.

When a dry season adversely affects the amount of water in a river, the timber industry suffers as the logs cannot be brought downstream. Such a season in 1910 caused 370,000 logs to be frozen in the Kalajoki and about 700,000 in the Siikajoki in the following winter.

Timber, in one form or another, accounts for about 50 per cent. of the exports of Finland. Most of it is cut into planks before being shipped, but some is exported in logs and spars. A considerable amount, however, is used at home for fuel (for there is no coal in Finland), and some is even exported for this purpose to Petrograd. Further quantities are used in shipbuilding, paper and paper-pulp manufacture, the making of bobbins (for which birch wood is used), and in the distillation of tar. And lastly, a great deal of timber is used at home in building, for except in the larger towns no other material is employed.

In some of the more populous parts there is no timber left except for local requirements. This is the case in several parts of Österbotten and the Aland archipelago, where the destruction of young trees for timber and for tar distillation has gone to great extremes. In the regions of Uleåborg and Torneå there is now a scarcity of timber, and in some regions, near Lake Saima and in southern Karelia, where the utilization of the forests on a large scale begun, there is even a shortage of wood for local needs. These instances, however, concern small areas and have no effect on the country as a whole.

Easy water transit makes it a simple matter to bring an adequate supply of wood to any place which has a shortage. Finland has immense untouched resources in timber which should yield all that is required for many years to come, even allowing for an increase in the demand. The average life of the trees used for big timber is a hundred years, and the growth is only one inch in five years. But though the rate of growth is slow and reafforestation is neglected, there is little fear of the timber being exhausted. Pines propagate like weeds, and every suitable acre, free from cattle, is growing a new forest, and long before the big trees of to-day are cut down a new generation of pines will have grown up to take their places. Agriculture will in places claim forest land, but its advances are limited by soil and climate, and forests will probably always remain the chief feature of Finland's vegetation.

The manufacture of tar is one of the oldest industries in Finland. Towards the end of winter the bark is removed from the selected trees to a height of 7 or 8 ft. from the ground, except for a narrow strip on the northern side, where the bark is strongest. This is left in order to keep the tree alive. The resin oozes out of the trunk and forms a yellow crust. Every year a little more of the bark is stripped. When the tree ceases to produce any more resin it is felled in autumn and cut into pieces about 3 ft. long. The logs from about 200 trees are piled on a kiln and covered with turf and earth. After the fire is lit the distillation takes about eight to fourteen days. The tar flows down the centre of the pile, and is conducted by pipes to barrels in a subterranean chamber. One burning yields about a hundred barrels. Kajana is a great centre of the tar industry, and the barrels are transported by boat to Uleåborg for export.

Agriculture

Food crops.

The ancient crystalline rocks of Finland disintegrate slowly and give an infertile soil. Calcareous matter is almost absent, and when it occurs is in a form that is not highly soluble.

Moraine matter, spread so widely over the old rocks, makes better soil, but it also lacks calcareous constituents, and often is too sandy. Soils of marked fertility are rare in Finland, and are found principally in parts where calcareous rocks occur, as in the Åland Islands and the regions to the north-west of Lake Ladoga. Other fertile regions are the sands and clays of the southern coastal plains. But in all the districts named the latitude and therefore the climate has of course an important influence on the fertility.

The gentle gradients of the plateau and heavy rainfall result in bad drainage, and the clayey soil is heavily charged with cold surface-water, which is prejudicial to vegetal growth and hinders the formation of humus. Drainage and cultivation help to overcome these deficiencies, but agriculture is arduous work and none too remunerative. The early nomadic inhabitants gradually settled in the more favourable sites, and for several centuries the Finns have been undergoing a slow transformation from nomadic hunters to sedentary peasants. The earliest attempts at agriculture entailed burning the forest. This method of clearing woods is primitive and wasteful. The timber is first felled, then arranged in piles over the ground and set alight. When the fire has burnt out, the ground is ploughed and sown. Tree stumps and stones remain, but the harvest is sufficient to supply cattle-food for the winter. Next year the ground is reploughed and sowed, and a second, but diminished, harvest obtained. The field is then abandoned. This method, known as the *sved* system of agriculture, is still practised in the remoter parts of Finland. Sometimes, however, a less wasteful method is followed. The field is allowed to lie fallow for a year, but before the seedlings of alder and birch have attained any size the ground is thoroughly cleared of tree stumps and stones. The stones are piled in heaps and lines, like the 'consumption dykes' of Scotland, and the stumps are burnt. The ground is then ready for cultivation. The Government have attempted with some success to put a stop to the more wasteful method of clearing, and the interval between successive burnings of the

same ground is regulated by law with a view to encourage the peasants to make each clearing permanent.

The total amount of land available for agriculture and cattle-raising is not great, and probably does not amount to more than 10 per cent. of the total area of the country, of which about one-third only is fit for cultivation of food crops.

The infertile soil is a sufficiently serious drawback, but the farmer has also climatic difficulties to face. Of these the worst is the tendency to night frosts in summer. He can adapt his agriculture to a short summer of three months in the north and five months in the south, but he can do little to guard against frosts in June, which destroy his rye, or in August, which injure his potatoes. One precaution, common among the early settlers, was to avoid the lower ground of the valleys, as being more liable to early frosts, in favour of the higher ground of the moraine hills. It was less fertile, no doubt, but less liable to frosts. The uncertainty of the summer with its possibilities of heavy rain or intense heat are other causes which make the yield of the harvest fluctuate a great deal from year to year. But in the last thirty or forty years agriculture has made great progress in Finland and now takes a most important place among the occupations of the people. Karelia remains the poorest region in the south, and the south-west of Finland is the most productive.

The increase of cattle-rearing has brought much profit to the farmers, for not only does it entail the growth of grass and root crops as cattle fodder and so promotes a rotation of crops, but it supplies the much needed manure for the fields.

Experience has shown what crops can most profitably be cultivated.

Wheat is of little importance and accounts for less than 0·3 per cent. of the total harvest. It is grown only in the extreme south-west, for nowhere else are climatic conditions suitable.

Rye is sown in August and, except wheat, is the only autumn crop. It does well in the south and centre of the country. In Österbotten it is considered a remunerative crop to 66° N.,

but farther north its success is doubtful. Experience taught the peasants that rye is repeatedly injured by frost. It used to be the chief crop in the country, but since 1902 it has been decreasing in favour of oats and now accounts for only about 30 per cent. of the total cereal production. Rye is the principal cereal used for bread in Finland. The demand is partly met by importation.

Barley is the oldest, and before the Swedes brought rye to Finland, it was the staple corn crop. It grows as far north as the pine, and in northern Finland is the principal crop, but in the south it takes a less important place. Several varieties are grown, and all are sown in spring. About 15 per cent. of the total cereal output is barley.

Oats were formerly grown only as food for horses, and though they are now used for cattle also the Finns have not yet learnt their value for human consumption. The cultivation of oats is extending northward, and they are gradually replacing rye, but north of 65° N. and 66° N. they seldom do well. Both the ordinary oats and the Hungarian oats are spring crops. The total production is over 50 per cent. of the cereals of the country. A good deal is exported to the British Isles.

One species of buckwheat has a limited area of cultivation in eastern Finland.

The potato is cultivated everywhere, even to the extreme north, and forms one of the principal foods. It is used to a small extent in the manufacture of starch and the distillation of brandy.

The turnip was grown in Finland earlier than any other crop, and was the peasants' chief food before the potato was introduced. It is now found mostly in the east, while in the south-west its cultivation has almost ceased.

The vetch has an important part in Finnish agriculture in the south, centre, and, to a less extent, in the north, for use with oats as green forage for cattle.

Grasses of many kinds and clover are grown, and the methods of haymaking show the climatic difficulties with which the farmer has to contend. To facilitate drying, the hay is hung

on fences or long pronged poles, which keep it clear of the ground. When dry it is carted in sledges to barns for storage. Open ricks are never made.

Crop of cereals and potatoes in bushels

	1913	1914
Wheat	159,000	190,000
Rye	9,951,000	10,942,000
Barley	4,742,000	4,181,000
Oats	20,339,000	18,967,000
Potatoes	17,794,000	18,157,000

The only industrial crops in Finland are flax and hemp. Both have been cultivated from early times. The areas of cultivation are localized and reach 63° N. and 64° N. respectively. Flax supplies the textile mills of Tammerfors to some extent. There is a prevalent superstition among many of the peasants that the growing of flax deteriorates the soil. This has decreased the production. In 1913 the crop of flax and hemp was 1,097 tons, and in 1914 it was 979 tons. Attempts to grow beets for sugar have recently been made in the south and have met with some success The beet yields about 15·8 per cent. of sugar.

Domestic Animals and Dairy-Farming.

Finnish horses are noted for their speed and strength, and are the chief beasts of burden. A small type, probably introduced by the Swedes, is found in many parts, especially on the coasts, but was formerly commoner than it is now. A larger type, originally brought from the east by the Finns, is widely spread and used as a draught animal. In 1913 there were 297,000 horses in Finland. The exportation of horses from Finland is prohibited.

Reindeer, found only in the north, are mentioned in Chapter IV.

Sheep are not very common and are kept only by the poorer peasants. In 1907 there were about 900,000 sheep on the land, and the number showed a decrease from previous years.

Pigs are found in all parts, but particularly in the southern

and central districts. The peasants, however, are not enthusiastic about pig-breeding, and the occupation shows little sign of increasing, although there is no reason why it should not hold an important place in the rural economy of the country. In 1907 there were 200,000 pigs in the country.

Poultry-farming and bee-keeping have both been neglecetd n the past, but now show signs of growing prosperity.

Cattle are most important, and their number is rapidly increasing. Almost all the cattle are kept for dairy purposes, and great efforts are made to improve the breed. With this end in view, Ayrshire and Jersey oxen have been imported and seem to do well. In 1913 there were over 1,100,000 cattle in Finland. There have always been many cattle in the country, and Finnish butter and cheese have long been famous, but it is only in recent years that dairy-farming has reached its present importance. In 1884 Danish co-operative methods were introduced, and there are now many steam creameries throughout Finland. In 1910 there were 607 dairies, of which 362 were co-operative societies (see p. 69). Hangö is the chief butter port and a great deal of Finnish butter used to reach England, often under the name of Danish butter, acquired by transhipment at Copenhagen. Since January 1913 the examination of all exported butter has been compulsory, and none that contains over 16 per cent. of water is allowed to leave the country. Dairies which produce butter of the highest quality are allowed to stamp the butter casks 'Suomi brand', which has come to imply a guarantee of excellence.

State aid for Agriculture

The State is doing a great deal to foster agriculture. Credit banks have been established and loans are made to peasant proprietors. Colleges of agriculture, of which there are many in addition to the University of Helsingfors, are spreading a knowledge of better methods and scientific applications. In 1910 State subsidies to agriculture amounted to £200,000, including amounts spent on agricultural colleges. Modern implements and agricultural machinery are coming

into use and replacing the primitive tools that have long persisted. Improved means of communication are bringing the farmer nearer to markets, and allowing Finnish products to reach other countries. This not only brings Finland greater prosperity, but robs it of some of the isolation it inevitably derived from its position.

Land Tenure

Over a quarter of the land under cultivation is in small estates of about 120 acres, and less than 10 per cent. is in large estates of over 3,000 acres. And this applies also to cattle-raising. The State lands are mainly forest (p. 96). Of the large privately-owned estates with much agricultural land most are in the centre or south and south-west. The growth of these estates is explained in two ways. Early Swedish immigrants found the interior and north of the land uninhabited and took as much as they wished for hunting, fishing, and their primitive forms of agriculture. This led to the unrestricted growth of large properties. Secondly, during the nineteenth century speculators in timber bought enormous tracts of forest land from peasants who were not fully aware of its value. Some of this is now agricultural land. There are two classes of peasants—tenants and labourers. The tenants hold their land from the large landowners for a minimum of fifty, to a maximum of a hundred years, which periods are established by law (1909). The law also secures to the tenant adequate compensation for any improvements carried out by him during his tenancy. The landless agricultural labourers account for 43 per cent. of the total population of Finland. Much of their occupation is casual and includes timber cutting. From this class comes the stream of emigrants who leave Finland year by year for America (p. 57). There is considerable dissatisfaction among the small farmers and peasants over the difficulty of obtaining land. They hold that the landowners should be compelled to dispose of any arable land which they fail to cultivate themselves, and so allow the peasants to acquire small holdings. This policy,

it is maintained, would not only provide land for many of the landless and so prevent emigration, but would increase the wealth of the country by doing away with the necessity of importing food on a large scale.

In July 1914 an import duty was put on imported grain and flour with a view to encouraging home production. It has so far resulted in an increased cost of food in Finland.

Fisheries

Apart from supplies for local use fisheries are not very important in Finland. The Baltic herring furnishes the most important fisheries and provides in normal times an annual export to Russia of about 5,000 metric tons. Sprats are sometimes caught in enormous numbers, but cannot be depended on from year to year. In good years the catch may amount to 200,000 metric tons, a large proportion of which is dried for export to Russia. The sea-fishing methods are still primitive. Steam is little used. The line and the seine-net are principally employed.

Mineral Resources

The rocks of Finland are poor in metallic ores. Copper was mined at Pitkäranta on Lake Ladoga till 1905, and at Orijärvi till 1882. The ores from the latter were smelted at Kärkelä. The works were leased to the Finnish American Mining Company, but closed down a year or two later. The Pitkäranta mines were bought by an English company in 1907, but apparently have not been reopened. The State recently made a large subsidy to cover the working expenses of the Outokumpu mines (Kuopio district) and some copper has already been placed on the market. Half the output was to go to the company, and half to the State. On the conclusion of peace in Europe the mine was to be let to a Finnish company. The content of the mines is estimated to be 9,000,000 tons of ore. Copper ore has been found at Kuusjärvi, in the Kuopio district. Zinc ores sometimes occur in association with the copper, but have been little worked.

Tin used to be extracted in small quantities at Pitkäranta, but the work has long since been abandoned.

Gold has been known for about a century in the alluvial sands of the mouth of the Kemijoki and neighbouring streams. It was not, however, until 1868 that it was found in workable quantities. Since then it has been washed in the bed of the Ivalojoki, which flows into lake Inari. Miners were attracted from the Urals and Siberia and even California and Australia, but they found the deposits were not rich and gave scope for few workers. The industry is now pursued on only a small scale. The output, which reached 56,692 grammes in 1871, is now scarcely 3,000 grammes a year. In 1909 a vein of gold-bearing quartz was discovered in the old mines of Iljärvi.

Silver used to be mined at Pitkäranta on Lake Ladoga and elsewhere in small quantities. There is now no silver mining in Finland.

Iron ore is the only widespread mineral in Finland and has been worked from early times. The principal ores, however, are low-grade limonites in the form of bog iron-ore, which contain much phosphorus and an average of only 35 per cent. of iron. They are found in many of the lakes, particularly in Karelia and Savolaks, sometimes near the banks and sometimes in greater depths, but the deposits are local and not widespread in any lake. Some lakes contain none and in others the supply is exhausted. The mineral is obtained with a hand-dredge worked from a boat or raft in not more than 17 or 18 ft. Stony bottoms and rough waters seem to hinder the operations. Steam-dredging has been tried without success, because the mineral occurs in small patches here and there and not in quantities sufficient to pay the cost of elaborate works in any one lake. Primitive iron works, using wood for fuel and water power, used to be scattered widely over the lake plateau. The occupation, however, was quite subsidiary to agriculture. Blast furnaces, to utilize the same ore, were built rather later, but practically all have been abandoned in recent years. In 1910 there were only two blast furnaces, using limonite, Strömsdal or Jurankoski, and Värtsilä.

Magnetic iron ores occur at Välimäki, Pitkäranta, and Kelivaara. The last two ores contain about 30 per cent. of iron. The most important deposits, however, are near Jussarö, an island to the south-east of Tammisaari in the Gulf of Finland, but the greater part of this is under the sea and so is known only by magnetic survey. It contains, in those parts that are worked, 38 per cent. of iron. Imported Swedish magnetic ore adds to the Finnish supply which feeds the blast furnaces in the south-west of the country. The iron industry is considered further on p. 109.

It was reported in 1918 that a syndicate, supported by Krupps of Essen, had been formed to investigate Finnish ore-deposits.

There is no coal in Finland.

Building Stone

The crystalline rocks of Finland are extensively quarried for building and monumental purposes. The most important is granite, which occurs in great variety of colour and texture. From the Viborg district a peculiar reddish-brown granite of coarse structure has been exported for over a century to Petrograd and Kronstadt for use in bridges, quays, and monuments. The granite from Pyterlaks quarry was particularly famous and supplied the giant monolith, 157 ft. high, erected in Petrograd to the memory of the Tsar Alexander I. Experience, however, has shown that this granite weathers badly in a northern climate, and it is now employed only in harbour work and for road metal. For other uses its place has been taken by reddish, streaked granite, especially hard and durable, which is quarried at Drottningborg, near Hangö. This can be obtained in large blocks and takes a high polish. Other granites of the same type, though varying slightly in colour and texture, are found in many parts of the south-west of Finland. Red granite from Vehmaa, as well as grey granite from the island of Haidus, near Nystad, are largely exported to Aberdeen, the centre of the granite industry in Scotland. Granite is largely used in street paving and

building in the towns of Finland. Helsingfors is entirely built of red and grey granite.

Dark diabase from Hyvinkää is in much demand for monumental purposes. Black diorite of Kaalamo, hornblende gneiss of Kalajoki, and green-grey gabbro of Jyväskylä are quarried for similar purposes.

Marble is quarried at Ruskeala, but it is difficult to obtain it in blocks large enough for trade purposes.

These marble deposits are now of importance chiefly for the manufacture of lime. But the most important source of lime is in the dolomites. At Pargas, near Åbo, lime has been produced for many centuries. These rocks continue to the south-west in the islands of Nagu and Korpo and inland to east-north-east. At several other places in the south an inferior limestone is dug for the same purpose.

Manufacturing Industries

Metals and Engineering

The absence of coal in Finland has always militated against the success of the iron industry, which is also handicapped by the poor ores of the country. The importation of coal or coke, and higher grade ores from Sweden, greatly increases the cost of working. Moreover, in a poor land like Finland capital is scarce and the rate of interest high. It is impossible therefore to manufacture heavy goods with profit, and Finland's iron industry is mainly concerned with goods required in daily use, such as tools, agricultural implements, wire, nails, &c. In 1913 the total production of iron in Finland was about 37,000 tons. Dahlsbruk, on Kimito Island, south-east of Åbo, is the largest iron works in Finland. Jokkis is a great centre for the manufacture of telegraph and telephone wire. Fiskars, near Skuru, manufactures cutlery. All the iron manufactures are increasing and are protected by a tariff on imported goods. There are engineering works at most of the large towns, as Helsingfors, Åbo, Tammerfors, and Viborg. Those at Helsingfors are the largest, and construct

and repair machinery of all sorts, including marine and gas-engines and electrical machinery. Those at Åbo, though not so large, can undertake as wide a range of work. Smaller engineering works exist at Karhula, Kotka, Björneborg, Vasa, Jakobstad, Gamlakarleby, Uleåborg, Nyslott, and Varkaus.

The workshops of the State railways are intended only for repairs, but are quite able to undertake new construction. They are at Fredriksberg near Helsingfors, Tammerfors, and at Viborg. Locomotives however are built at private works at Åbo. Practically all the output is for home use.

Small steamers, of under 400 tons, are built in Finland, and this industry is increasing. There is a growing demand for motor boats, the hulls of which are built locally. The engines are imported from Sweden, America, and, formerly, Germany. The largest ship-building works are at Åbo, and there are others at Björneborg, Viborg, Kotka, and at Varkaus on Lake Saima.

Timber Manufactures

There are at least thirteen factories, of which six are large, for the manufacture of bobbins from birch-wood. This industry demands certain conditions which exist in Finland. Over 90 per cent. of the wood is wasted in the process of manufacture, so that the industry can be carried on only where, on the one hand, the wood is abundant and transport cheap, and, on the other hand, the waste material is in demand in factories that utilize wood for fuel. Birch-wood is plentiful, but is too heavy to be floated like other logs, and must be transported in barges.

The largest factories are at Kaukas, near Lappeenranta, on Lake Saima, Tainionkoski on the Vuoksi river, and Lahti. Two near Kuopio were bought in 1912 by Messrs. J. and P. Coats, of Paisley.

For the tar industry see p. 99.

Papermaking is another industry much favoured by conditions in Finland. A plentiful supply of water is essential, not only in the manufacture of the pulp, but in driving the

machinery. Spruce or fir and to a much less extent Scots pine are used for most paper, but aspen is employed in making especially white pulp. The industry is an old one, dating from the seventeenth century, and early in the nineteenth century there were ten mills making hand-made paper. Machinery was first introduced in 1841, and about the same time wood began to replace rags. As a result, the manufacture of wood-pulp, and also of paper, was enormously developed, thanks largely to the abundance of cheap water-power. For many years the Finnish mills produced pulp only, but the tendency to produce finished paper is growing. Most of the pulp- and paper-mills are in the south of the country and are named after the falls on which they are situated. Hence the names end in *-koski*, the Finnish word for a waterfall. In many mills electric generators have been installed and the use of these is growing. Some mills, especially in the Viborg district, are outgrowing the available water-power and are showing reduced output in consequence. The largest mills are on the Kyminjoki. Others are on Lake Näsijärvi, the Kokemäenjoki, and the Vuoksi. In 1908 there were 44 factories of pulp, 16 of cellulose, 23 of paper, and one of cardboard, but these numbers have since increased. In 1914 there were 17 cellulose factories. In 1910 the mills were using 77,200 horse-power.

Cellulose is manufactured either by cooking the wood with a solution of sulphite of calcium or magnesium, or by the 'sulphate' process, in which the active substances are caustic soda and sodium carbonate and sulphate. Spruce and a small quantity of aspen are used in the first process, and in the last the waste ends of pine and spruce from saw-mills. Factories using the sulphate process cause an unpleasant smell over a wide surrounding area, but efforts are being made to overcome this nuisance.

Practically all the pulp and cellulose and the greater part of the paper are exported. The export figures given in Chapter VIII will therefore give an idea of the amount produced.

With the growth of the paper industry there is great competition to acquire timber, and the price of forest land is rapidly rising. Owners of forest show strong disinclination to part with land or give more than two or three years' lease for felling timber, owing to the rapid rises on the market. The rise in the price of timber is resulting in papermaking becoming more profitable than saw-milling. The same amount of timber gives five times the return when made into paper that it does in sawn timber, but papermaking will always be confined largely to spruce-wood, as pine is less suitable.

Textiles, Glass, &c.

The textile industry on a large scale is of recent development, though flax and wool from early times have been manufactured in scattered hand-looms. Cotton is now the most important material used. Tammerfors is the chief seat of the industry, which was started in 1821 by Scottish initiative. There are also important factories at Forssa, Åbo, Björneborg, and Vasa. The raw material comes from America, and until 1906 was imported duty free. Most of the manufactured goods are used in Finland, and what is exported goes to Russia. Only one mill at Tammerfors makes linen. Woollen goods are manufactured in these and other towns, including Helsingfors. There are altogether 27 woollen mills. Most of the raw material is imported.

There are over 800 tanneries and at least fifteen leather factories, of which that at Uleåborg is the most important. There are important boot factories also at Korkeakoski on the line to Vasa, at Raumo, Tammerfors, and Uleåborg. The leather used is partly of Finnish production, and partly imported from South America, but Finland also exports skins, principally to Russia.

Glass-making is an industry of some small importance, and dates from far back in Finland's history. It is mainly concentrated in the south of the country, and depends on imported material. All kinds of glass goods are made, but principally

window-glass and bottles. There are considerable exports to Russia.

Among minor industries are soap, candles, colours, matches, &c., all for home consumption. The 26 tobacco factories import two-thirds of their raw material from Russia. There are several sugar refineries, which have much increased the consumption of sugar in Finland in recent years. In 1910 there were 29 flour mills depending mainly on imported corn and rice. The most important are at Vasa, Kuopio, and Viborg. This number does not include small mills for domestic use.

The number of distilleries has been steadily decreasing in recent years, as the duty on brandy (50 per cent. alcohol) increased from about 4*d.* a litre to 2*s.* a litre, which it was in 1910. The raw material is mainly imported maize, but some rye and barley are also used. Potatoes are seldom employed. The importation of raw spirit is prohibited. In 1908 there were ten factories of Finnish and Swedish punch. Breweries exist in all centres of population. There is a duty on malt, which was about 3*s.* 3*d.* a pound in 1910.

There is a certain amount of peasant industry (*koustar*) throughout Finland. The total production was valued in 1913 at about £400,000. Flax and woollen weaving are decreasing, but basket and brush-making flourish. There is also some cart- and carriage-building and a large output of snow-shoes.

The present industrial policy of Finland is to manufacture everything possible for her home needs rather than pay attention to exports—except in those productions like timber, pulp, &c., in which she is pre-eminent.

Excluding peasant industries, the number of persons engaged in industry in 1910 was 92,928, and the value of production 625,655,300 Fmk., which is about £25,000,000. This includes the industry in raw timber.

Water Power

In the absence of any but imported coal the economic prosperity of Finland depends on water power, and for this to be useful a regular supply of it is necessary. Only on rivers

where that is possible do large centres of industry arise. On some of the rivers of Österbotten the supply of water is adequate only during a few weeks of flood, which puts a definite limit to the growth of the industries which the lack of raw material curtails. The freezing of the rivers does not stop, though it interferes with, the power installations. Some of the rapids never freeze, but contain comparatively little water in winter. A far greater obstacle is the spring floods, which sometimes destroy the works. For industrial purposes the most important water-courses are the Vuoksi, Kyminjoki, Kokemäenjoki (Kumo), and Oulunjoki (Uleå). These rivers have many rapids, but waterfalls are rare. The upper Vuoksi has several small falls, of which the highest is the famous fall, or series of falls, at Imatra, which in a little over three-quarters of a mile has a total fall of 60 ft. The steepest gradeint is in the centre, 40 ft. in about 300 yds., in a rocky gorge 65 to 80 ft. wide. The Kyminjoki has five falls of 16 to 29 ft. in its upper and middle courses, and two of 26 ft. in its mouths. Two of the rapids on the Kokemäenjoki, with a drop of 19 and 23 ft., almost deserve to be called waterfalls, in addition to one of 46 ft., and the fall at Tammerfors of 59 ft. The Oulunjoki at Pyhäkoski has the greatest fall in Finland, but its total drop of 187 ft. is spread over twelve miles, so that it is really a succession of rapids. There are other falls in Finland, but few that are more than a prolonged series of rapids. Rapids, on the other hand, occur along every river (p. 24), but not always with sufficient gradient to allow their utilization for water power. The following are some of the chief rapids and falls used for industry, with the horse-power employed in 1910 :

	H.P.	
On the Vuoksi.		
Tainionkoski	6,000	Paper pulp.
Räikkölänkoski (Enso)	4,000	Pulp and cardboard.
On the Kyminjoki.		
Voikankoski	5,100	Pulp and paper.
Kuusankoski	9,100	Pulp and paper.
Myllykoski	2,200	Pulp and paper.
Anjala	4,700	Wood pulp.

Karhula (Korkeakoski)	2,600	Wood pulp.
Strömfors	230	Iron works.
Stockfors	3,400	Wood pulp.

On the Kokemäenjoki.

Tammerkoski	6,800	Paper, cotton, wool.
Nokia	3,600	Pulp and cellulose.

In these and other cases the two sides of the rapid are not always utilized, and so only a small proportion of the available horse-power is employed. One or the other in some cases belongs to a village which has rights to the water (p. 117). But quite apart from these restrictions many useful falls are not yet harnessed. In fact, the greater part of the water-power of Finland is still unutilized. The Kyminjoki from Lake Paijänne to the sea affords a calculated horse-power of 274,000, of which only about 30,000 were in use in 1910. In the Kokemäenjoki, at the same date, 10,400 h.p. were utilized out of 215,000, and in the Vuoksi 10,000 out of 435,000 h.p. The following are among the most important rapids and falls not utilized (1910): Imatra (80,000 h.p.), which is preserved by the State on account of its beauty; Vallinkoski, with the contiguous rapids of Myllykoski, Torpankoski, and Kyyrönkoski, with a total of 44,000 h.p.; and Rouhialankoski, 24,000 h.p.; all in the Vuoksi. In the Koita the two rapids of Pamilankoski and Kuusamonkoski would give together 10,000 h.p. In the Kyminjoki are Mankala, 5,600 h.p., Keltis, 7,000 h.p., the western side of Anjala, 6,200 h.p., and Rökhus and Sjöfors in the western mouth with 7,200 h.p. In the Kokemäenjoki are Pirilänkoski, 10,000 h.p., Harjavalta, 8,000 h.p., and Meskalankoski, 4,000 h.p. In the Oulunjoki are Kantokoski, 5,000 h.p., Siitarinkoski, 15,000 h.p., Pasko, 3,000 h.p., and Pälli, 4,000 h.p. On the Kajana, a tributary of the Oulunjoki, are Koivukoski and Ämmäkoski, with 2,700 h.p. and 3,700 h.p. respectively. In the Kemijoki is Taivalkoski with 15,000 h.p. To this list could be added several falls with less than 2,000 h.p. The proportion in use of the total available power is about one-fifth at the most, and if all the lesser falls are taken into account, not

one-thirtieth. Though industrial activity continues to make growing demands on water-power, it is unlikely that most of it will be utilized. Cheap water-power is probably the only condition in Finland that favours industry, and by itself is insufficient to promote it on a large scale. Wood is the only raw material in the land, and the easy water transport to the coast favours its cheap exportation in a natural state. The pulp industry absorbs a relatively small amount of capital. Many industries would require costly plant and imported raw material, and so are impossible. Lastly, it must be remembered that capital is not abundant in Finland, nor are unsupplied markets near at hand.

In 1912 a Russo-German company tried to get a lease of the rapids of the upper Vuoksi with a view to supplying Petrograd with electric power. They estimated that the proposed works would supply 300,000 to 400,000 h.p. The application, however, was rejected on expert advice.

The cost of water-power varies widely. Speaking generally, it is increased by the length of the rapids in proportion to their fall, and would be cheaper were abrupt falls more common. It is generally estimated that the total expense, including capital outlay on dams, conduits, turbines, and power station is from £4 to £20 a horse-power, with an average of £12. The State enacts a certain payment for the use of the water. This is highest in the case of the large rapids near lines of communication, which are most in demand. In 1910 the price varied from £2 to £4 per horse-power a year.

Water Rights

With the utilization of water as a source of power is intimately related the question of water rights. In 1868 it was enacted that, in case of factories using water-power, one-third of the water-course in its deepest part must be left clear and open so as not to interfere with navigation or the passage of fish. In 1889 a concession was made to manufacturers which allows them to construct a temporary dam in case of shortage of water, if there is little traffic along the water-course. And

if it causes no serious damage to any one, the manufacturer is now allowed, on payment, to change the channel of the watercourse or even to close it by a permanent dam, if the traffic is inconsiderable. A temporary dam must have a gate for rafts and a way for fish.

Usually the rapids as well as the streams are private property in the hands of a village community, and it is difficult for a manufacturer to acquire absolute proprietorship.

For problems relating to the use of rivers and lakes as lines of traffic see Chapter X.

CHAPTER VIII

TRADE AND SHIPPING

Imports and Exports—Shipping—Consuls—Tariffs

Imports and Exports

The external trade of Finland is little more than a century old. Before that the tariffs imposed on exports and imports were so prohibitive as to discourage trade, even had Finland been rich enough to take part in it. In 1856 the imports of Finland were £1,556,000 and the exports £588,000, while in 1913 the figures were respectively £19,813,600 and £16,142,000. This increase in consumption and production is not so much due to increase in population as to economic progress and the development of the country. Growth in trade suffered a set-back during the '80's of last century, largely as a result of economic stagnation in Russia, with whom Finland did most of her trade in those days.

It is a difficult matter to state with accuracy the countries of origin and destination of Finland's external trade, because the returns give the last country touched at before entering Finland and the first after leaving. Obviously this results in Denmark's share of the trade being unduly high and that of (e. g.) the United States of America much smaller than is really the case. Germany, Russia, and Britain are, however, more important than any others. These are given in the order of their volume of trade. Russia's pre-eminence is readily intelligible, not only on account of her proximity and land connexions, but because of the preferential tariffs between the two countries. The trade with Russia has been falling off to some extent in recent years despite the customs law of 1907, which admits most Russian goods to Finland free

of duty and gives diminished duties on many Finnish manufactures entering Russia. In 1913, however, there was again an increase in imports from, and exports to, Russia, and the figures were £5,600,000 and £4,532,000 respectively, which represented about 30 per cent. of the total trade of Finland, Exports to Russia are mainly paper, pulp wood, dairy produce, fish, some wood (mainly for fuel), wooden, textile and metal goods.

Germany's share of Finland's trade has been growing steadily for 20 or 30 years. In 1887 the imports from Germany were only about £1,130,000, in 1908 they were £5,840,000, and in 1913 were £8,100,000. The exports to Germany are considerably less (£2,087,000 in 1913), and have never approached Russia's figure. However, since 1907 the total volume of trade with Germany has been greater than with Russia, and in 1913 was over 30 per cent. of Finland's total trade. Germany had become the market that supplied Finland with all kinds of manufactured goods including clothes, many goods from the east including spices and a great deal of the corn she required. To Germany Finland sent wood, paper, and dairy produce.

Britain came third in her volume of trade with Finland. Her imports to Finland, which by the vagaries of trade returns include a great deal of American goods, remain fairly stationary and even show signs of decrease. In 1913 they were only £2,426,000, less than a third of Germany's figure and not half Russia's. Britain's exports from Finland are, however, growing steadily, and in 1913, at £4,342,000, were over 25 per cent. of Finland's total export trade. The exports are wood, paper, cellulose, and dairy produce, especially butter. The imports include coal, metallic ores and metals, textile goods, American cotton, American grain, &c.

Other countries have only a small share in Finland's trade. Denmark's share is falsified by statistics as already explained, and the same applies in a less degree to Sweden. France, Spain and other countries which have a small share of the trade have a much larger proportion of exports than imports.

In 1913, the last normal year for which figures can be given, the chief exports of Finland were as follows :

	£
Timber in various forms	9,097,600
Butter	1,410,800
Paper, pulp and cardboard	2,851,000
Iron and iron goods, textiles, leather, hides, tar, pitch and fish	1,820,563
Total	15,179,963

The chief imports in 1913 were :

	£
Cereals	3,961,440
Coffee and chicory	974,200
Sugar	764,400
Iron and ironware	1,165,480
Cotton	691,720
Cotton goods	518,400
Machinery	1,322,780
Chemicals, leather goods, tobacco, colours, oils, &c.	9,180,305
Total	18,578,725

The most important export of Finland is timber, in logs, pit-props, planks, &c. In 1913 the total export was 295,550,000 cubic feet, of which a large part went to the United Kingdom. The exports of paper and pulp have shown some fluctuations in recent years. In 1913 they were 120,394 tons of pulp, 53,730 tons of cardboard, and 145,632 tons of paper.

The export of butter in 1913 amounted to about 12,000 tons, valued at about £1,500,000. The United Kingdom took 80 per cent. and Germany most of the remainder, but some went to the United States.

The import of coal in 1913 was about 585,000 tons, supplied almost entirely by the United Kingdom.

The amount of cereals imported is rapidly increasing. In 1913, including flour, it was 435,297 tons. The bulk of the wheat flour entered via Germany, but the importation of rye from Russia was increasing.

Shipping

The figures quoted above for the import and export trade of Finland show comparatively litt e difference, and what excess there is is on the import side. The greater part of the exports

is timber, a bulky and cheap commodity, while the imports are relatively high priced in comparison with their bulk. Consequently much of the shipping which arrives in Finland does so in ballast, while none clears without cargo. Some of the smaller ports have a large export trade in timber, but practically no imports. Of the larger ports Viborg had the greatest volume of shipping in 1913 with a total of 765,898 tons, of which about 8·5 per cent. was British and over 17 per cent. German. Helsingfors came next with a total of 716,114 tons, of which 2·8 per cent. was British and over 15 per cent. German. Helsingfors leads in imports. Åbo was third with 572,197 tons, of which only 1 per cent. was British and 10 per cent. German. Kotka, with its great export trade in timber, came third with a total of 483,287 tons. Of this 5 per cent. was British and 15 per cent. German. Hangö dealt chiefly with exports, and her total tonnage entered was 436,870, of which less than 1 per cent. was British and 10·8 per cent. German. In all ports the bulk of the shipping entered and cleared was Finnish.

On January 1, 1914, the mercantile marine of Finland numbered 3,077 sailing vessels of a total tonnage of 356,136 tons and 570 steamers of 76,381 tons. The largest steamship company on the Finnish register is the *Finska Ångfartygs Aktiebolaget* with regular sailings to Copenhagen and Hull, Reval and Stettin, Stockholm, and Petrograd. Their largest steamer, the *Titania*, was built in England in 1908 and has a tonnage of 3,463, and was largely used in the emigrant traffic to Hull for America.

Late in 1918 the *Nystad Ozean Reederi* and the *Finska Transozeanska Handels Aktiebolaget* were formed to engage in overseas traffic beyond Europe.

Consuls

Finland is a British Consular District with a Consul and a Vice-Consul resident at Helsingfors. There are also Vice-Consuls at Åbo, Björneborg, Gamlakarleby, Hangö, Kotka,

Kristinestad, Lovisa, Nikolaistad, Raumo, Tammerfors, Torneå, Uleåborg, and Viborg, and a Consular Agent at Borgå.

Tariffs [1]

There are two separate tariffs, one for goods imported from Russia, and one for goods from other countries. The first is particularly favourable to Russia. All goods except sugar, tobacco, and alcoholic liquors enter free of duty. Finnish manufactured goods pay duty on entering Russia but at a lower rate than goods from other countries. The tariff against other countries allows raw materials to come in free or under low duties. Most food stuffs are admitted free, but sugar is rated heavily. Manufactured goods pay a higher rate than raw materials. The highest rates are on alcoholic liquors and luxury articles.

[1] These notes on tariffs apply to 1914. Since the Russian revolution they have been modified. The Brest-Litovsk and subsequent treaties gave preference to Germany.

CHAPTER IX

FINANCES

National Budget—National Debt—Banks—Savings Banks—Insurance

National Budget

The greater part of the revenue of Finland was derived from indirect taxation, customs, railways, State forests, and post-office. Direct taxation accounted for only about one-thirtieth of the total revenue. As regards expenditure the greatest outlays were on public works and education. There was also an annual contribution of £560,000 to Russia in lieu of military service.

State Budget for 1913

Receipts.	*Fmk.*
Direct taxes	6,500,000
State properties:	
Lands	1,700,000
Fisheries	92,000
Forests	16,000,000
Railways	58,000,000
Canals	1,000,000
Interest	1,900,000
Indirect taxes:	
Customs	58,000,000
Duties on spirits and playing cards	13,000,000
Stamp duties, licences, &c.	5,000,000
State institutions:	
Posts, lighthouses, hospitals, schools	11,500,000
Miscellaneous:	
Fines, sales of land, prison labour, &c.	600,000
Total	181,000,000

Expenditure.	*Fmk.*
Imperial residences	429,000
Expenses of Diet	682,000
Government (including Governor-General's salary)	3,000,000
Justice	5,400,000
Civil administration	15,300,000
Customs, mint, public granaries, stamp office, &c.	4,000,000
Canals and forests administration	5,926,000
Payment to Russia in lieu of military service	14,000,000
Education, arts, science, religion	20,950,000
Agriculture and fisheries	7,700,000
Roads, railways, bridges, canals, posting, pilotage	51,000,000
Control of distilleries	7,500,000
Pensions and gratuities	5,500,000
Public debt expenditure	8,027,000
Miscellaneous	7,900,000
Total	158,700,000

Various war taxes were imposed from 1914 onwards, including licences to sell alcoholic beverages, a tax on railway tickets, a tax on amusements, a tax on money on deposit in banks and on interest and divident warrants, a tax on telephones, a tax on the transport of goods and luggage, and other taxes.

National Debt

The public debt of Finland in 1913 was Fmk. 172,000,000. At the end of 1915 it was Fmk. 169,368,117. The loans were practically all raised for railway construction purposes. The capital was found by the Bank of Finland, S. Bleichröder, the Crédit Lyonnais, and C. J. Hambro and Sons.

Banks

The Bank of Finland is a State bank. It was founded in 1811 and taken over by the Diet in 1868. The governor and directors are nominated by the Grand Duke, but the board of administration and the auditors are appointed by the Diet. The Bank of Finland is the only bank in the country which has the right to issue notes which it may do up to the total value of Fmk. 70,000,000. Since the outbreak of war the

bank's note issue has probably been increased beyond this sum. The profits of the Bank of Finland in 1913 were Fmk. 6,502,000 in round numbers. In 1915 the balance sheet showed a loss of Fmk. 21,000,000.

In 1914 there were also 12 private banks in Finland, of which the principal were the Föreningsbanken, Kansallis Osake Pankki, and Nordiska Aktiebanken. Some of these banks have branches all over the country; others are purely local. On January 1, 1912, the number of branches of banks, including branches of the Bank of Finland, was 161. No Russian or foreign banks have branches in Finland.

Savings Banks

At the end of 1912 there were 391 savings banks in Finland, with total deposits amounting to nearly Fmk. 300,000,000. The post-office savings bank in the same year received Fmk. 3,780,000 in deposits and paid Fmk. 3,760,000 in withdrawals.

Insurance

Most insurance business is in the hands of Finnish companies. In 1912 about 90 per cent. of the total insurance premiums were paid to Finnish companies.

CHAPTER X

COMMUNICATIONS

Navigable Waterways—Roads—Railways—Telephones—Telegraphs

Navigable Waterways

Finland is traversed in all directions by lakes and water-courses, along which settlements gradually penetrated to the remotest parts of the interior. Water was the chief factor in the civilization of the country, and even to-day is scarcely superseded by roads and railways.

Water still controls the distribution of population, whether the people are occupied in agriculture or in manufactures. The distribution of the lakes and the features of the rivers are given in Chapter I, where it is explained that many of the lakes are separated one from another by narrow isthmuses. The significance of these is illustrated by the frequency with which the word *taipale* (a portage over an isthmus) enters into the composition of Finnish names. Little labour, compared with the immense advantage gained, was required to cut many of these isthmuses by short canals, and so link one waterway with another. In some cases, but by no means always, this entailed the construction of one or more locks.

The most important waterways of Finland have been well surveyed, and charts of several of them are published, but a great deal remains to be done off the chief routes. The navigation is so intricate, however, that it is impossible without pilots. The pilot stations on the lakes are indicated below in the description of the lake routes. The inhabitants of the lake and river banks invariably have local knowledge of the waters in the vicinity, but, as with most peasants, their knowledge is strictly limited. The larger lakes have unwatched lights on most of the main routes, but the system is incomplete. However, it can be of little use as there is not much darkness during the period of navigation.

While the lakes form admirable waterways, the rivers, on the other hand, are disappointing because of their winding courses and their numerous rapids (Chapter I). Again the frequency of the word *koski* (rapid) in Finnish place-names illustrates the latter of these characteristics. However, many of the rapids are not too formidable to be overcome by skilled boatmen. The Finns have evolved a boat 40 to 50 ft. long and about 40 in. wide, high peaked fore and aft, and built entirely of fir wood ¾ in. thick. No iron is used in its construction. These boats, in virtue of their strength and elasticity, are peculiarly well suited for shooting rapids. They are generally known as tar-boats, for their chief use is to transport to the coast barrels of tar prepared in the forests (p. 99). Several of the rivers of Finland are navigated by these boats, but there are comparatively few that can be navigated for long distances. Here and there a waterfall entails a portage, but in some cases small rapids have been cleared. Hardly any rivers have no navigable stretches, but in many cases the stretches are so short that they have only local importance, unless it is for floating logs and rafts of timber. There is little steamer navigation on the rivers, but that is partly because the steamers, being built for the lakes, have too deep a draught. If flat-bottomed steamers, like those in use on some Chinese rivers, drawing about 6 in., were introduced, the useful waterways of Finland could probably be widely extended. Some idea of the use to which Finland's waterways are put for commercial purposes may be gathered from the fact that in 1906 over one and a half million tons of merchandise passed through the locks of Finland, and a little over three million tons went by rail. In 1913 the number of vessels which passed along the canals was 53,340.

River Waterways

The navigable rivers of Finland are mostly in the north, if the short rivers connecting lakes are excepted. The most important are the Tornionjoki and its tributaries, the Kemijoki and its tributaries, the Iijoki, and the Uleå (Oulunjoki).

It must not be forgotten that these northern rivers have a navigable period of only about four months. The rivers flowing to the Arctic Ocean are of some use for boat navigation, but larger craft cannot use them on account of the many rapids.

The **Tenojoki** or **Tanaelv** is formed by the union of the Karasjoki and the Inarijoki. These two streams rise in Enontekiö and the Tenojoki flows into Varanger Fjord. The Inarijoki and one of its tributaries, the Skjetsamjokka form the Finno-Norwegian frontier for 72 miles and the Tenojoki forms the frontier for 84 miles. The last 36 miles of the Tenojoki are entirely in Norwegian territory. For the political division of the islands in the river see *Handbook of Scandinavia.* Boats can navigate the Tenojoki to the confluence of its head streams. The gradient is not steep and the only formidable rapid is at Storfos, about 45 miles from the mouth, which has a fall of 23 ft. in 1,000 yds. Changing shoals and sandbanks give trouble. The width of the river varies from 200 to 800 yds. The mouth is wider.

The **Näätämojoki** or **Neidenelv** rises in Lake Inari and after a course of 63 miles, of which 50 are in Finland, flows into Kjö Fjord, a branch of Varanger Fjord. It is shallow and about 50 yards wide. In its Finnish reaches small waterfalls and rapids prevent navigation, but its Norwegian course can be navigated by small boats, which, however, must be carried past the falls. The valley of the Näätämojoki, like that of the Tenojoki, affords a good lowland route to Varanger Fjord.

The **Paatsjoki, Pasvikelv,** or **Paz,** is a large stream flowing from the east of Lake Inari to Bog Fjord, a branch of Varanger Fjord. Only 11 miles flow through Finnish territory, while for 66 miles the river forms the Russo-Norwegian frontier. The Paatsjoki is formed by a chain of narrow lakes linked by short turbulent stretches of river. Boats can be poled throughout its length but must be carried round the falls. More information about this river is given in the *Handbook of Scandinavia.*

The **Torneå** or **Tornionjoki** rises in Swedish Lapland and

flows south-east. From about lat. 67° 10′ N. to the sea it forms the Finno-Swedish frontier. The most important tributary is the Muonio, which, rising in Lake Kilpisjärvi in Enontekiö, at the meeting of Norway, Finland, and Sweden, forms the Finno-Swedish frontier as far as Lappea near Pajala, its point of confluence with the Torneå. The Muonio and Torneå are both interrupted by rapids and are shallow, yet they can be navigated by boats at least as far as Siikavuopio, near the source of the Muonio. As far as the confluence of the Muonio from the sea the Torneå is fairly broad and much split into parallel streams. It gives in parts the impression of a chain of lakes joined together by short streams on which the rapids occur. The most important rapids from the mouth upwards are as follows: Kukkolankoski or Jylhäkoski, in lat. 66° N., a few miles south of Karunki, 4,900 ft. long, with a fall of 26 ft.; Matkakoski and Vuoennonkoski, close together in about lat. 66° 10′ N. to lat. 66° 15′ N., with a drop of 16½ ft. and 52 ft. respectively; Kattilakoski, lat. 66° 30′ N., with a fall of 26 ft.; Korppikoski, about lat. 66° 36′ N. north of Turtola, fall 11 ft.; Valkiakoski, about Pello in lat. 66° 48′ N., fall 18 ft.; Jarhoiskoski, below the mouth of the Naamijoki, fall 14 ft.; Hietanenkoski, lat. 67° N., fall 11 ft.; Jaapakoski, about lat. 67° 6′ N., fall 13 ft.; and Lappea, fall 28 ft., at the mouth of the Muonio. Beyond this the rapids become more numerous. At Muonioniska are big rapids which cannot be ascended, and the descent of which is difficult, but not usually impossible. The river from the sea is ascended in shallow-draught boats that are not rowed but poled. There are two polemen and a steersman, whose place is in the bows. Near the rapids the current is too strong in the centre of the river, while near the shore the bed is too much impeded by rocks and sandbanks to allow room for oars. In the quiet stretches of the river rowing is possible. In the rapids the polemen have to use all their strength to move the boat forward. The descent of the river is comparatively easy, and few of the rapids cause serious difficulties. The post-road from Torneå to Muonio has now been extended to Palojoensuu, and from there a sledge track

runs along the river in winter to Lake Kilpisjärvi, and through Norwegian territory to Skibotten on Lyngen Fjord (see p. 141). On the Swedish side there is a road as far north as the confluence of the Muonio. On the Finnish side the railway meets the river at Torneå, but on the Swedish side it ascends to Öfver Torneå.

The Muonio and Torneå flow through unproductive sparsely populated lands. The few inhabitants are Lapps who live along the river banks, or in summer wander to the higher ground in order to free their herds of reindeer from irritation by mosquitoes. During the early years of the war, however, an enormous volume of passenger and mail traffic crossed the Torneå at Torneå, through which town passed most of Russia's summer traffic, and practically all her winter traffic with western Europe.

The **Kemijoki** and the **Iijoki** are both used for boats and floating timber almost from their sources to the sea. The Kemijoki has comparatively few rapids on its lower course, but the Iijoki and its tributaries are studded with rapids from their sources to the sea. Some small improvements in their navigation have been effected from time to time.

The **Uleå** or **Oulunjoki** is the most important of all these northern rivers in its volume of traffic despite its numerous small rapids. Shallow-draught steamers can ascend from the mouth to the village of Muhos (22 miles) whence there is a passage for boats to Lake Oulujärvi and Kajana (85 miles: railway). But the ascent is difficult, and the river is mainly used for the descent. At Vaala, at the exit of the river from Oulujärvi, is a harbour where the tar boats await their turn to pass down the river and shoot the rapids. The boats are either broken up at Uleåborg or pulled up stream by their crews. The strait between Oulujärvi and the lakes to the east, on which is Kajana, is navigable by steamers through two locks at Kajana, called Ämmä and Koivukoski respectively, built in 1846 and rebuilt from 1866 to 1871. These locks were specially constructed for tar boats, and so are long (67 to 72 ft.) but narrow (7¾ ft.) and only 4 ft. deep. The change of level in

Ämmä lock is 21 ft., which is almost double that in other canals. Immediately to the east of the Koivukoski lock a short canal, through a bend in the channel, avoids the Petäjakoski rapids. Boats can pass eastward through Lake Nuasjärvi by Sotkamo, Lake Kümasjärvi, Lake Ontojärvi, Kuhmoniemi and Lake Lentuanjärvi. There is also a way for boats from Lake Oulujärvi up the broad Keihimänjoki, to Lake Iijärvi, up the Emäjoki, through Lake Hyrynjärvi to Lake Kiantajärvi.

The **Kokemäenjoki** or **Kumo** flows from Lake Pyhäjärvi westward to the Gulf of Bothnia. It is studded with rapids which effectually impede steamer traffic but have brought a large industrial population to its banks. Some of the smaller rapids have been cleared and boat navigation is possible through long stretches. Steamers can ascend from the sea to Björneborg, three miles up, by an 8-ft. channel, and the river is navigable to Haistila, nine miles farther up. In the upper part of the river is a series of linked lakes navigated by steamers between Tyrvää (railway), on Lake Rautavesi, to Suiro (on the same railway) on Lake Kulovesi. The broad channel of the Kokemäenjoki between Pyhäjärvi and Kulovesi is effectively blocked by the long steep rapids of Nokia.

The **Kyminjoki** (described in Chapter I, p. 25) is unimportant as a navigable waterway on account of its rapids. Vessels drawing not more than 6 ft. can pass from Lake Päijänne by the Kalkis Canal down the river as far as the rapids of Koskenniska, where it issues from Lake Konnivesi. Many stretches of the river are navigable by boats, and there are steamers on the linked lakes of Kirkhojärvi, Urajärvi, Pelinginselkä and Pyhäjärvi, through most of which the Kyminjoki runs. The lower river is navigable for steamers of five-foot draught from Korkeakoski (Karhula) rapids to the sea (about 4 miles). The Kyminjoki is important as a route for floating timber from the interior to Kotka.

Proposals to improve the navigation of the river date from half a century ago. The plan entails a five-foot channel with

27 locks between Lake Paijänne and Kotka, but the expense is prohibitive and the canal at Kalkis is the only one which has been built. A later suggestion was to make a short cut between lakes Konnivesi and Pyhäjärvi from the Gulf of Syvälahti to the Gulf of Kimolanlahti and so avoid a long unnavigable stretch of the river. But all schemes for improvements in the Kyminjoki navigation seem to have been abandoned when the railway from Lovisa to Lahti was rebuilt.

In the south-east of Finland the only important river is the **Vuoksi,** which flows from Lake Saima to Lake Ladoga. Navigation in the upper part of the river is blocked by the Imatra falls. There is steamer traffic from Antrea (railway) via the middle Vuoksi and the long narrow Lake Suvanto to the lake. There are locks at Paakkola and Pölläkkälä.

In Russian territory there are several waterways leading to and from Lake Ladoga. The **Neva,** the chief outlet, is navigable from the lake to Petrograd (about 40 miles) and the sea, but has a three-knot current with northerly winds. With westerly winds the current is weaker. From Sheremecheska on Lake Ladoga, on the west side of the Neva, there is a railway to Petrograd (about 25 miles). A canal runs along the south shore of Lake Ladoga between the Neva and the Svir. The Svir affords communication to Lake Onega whence there is river and canal connexion with Arkhangel and with the Volga waterways at Ribinsk. Shallow-draught steamers of small size can make either journey.

Lake waterways and canals

All the lakes of Finland are navigable, although their coastal waters are often shallow (see Chapter I). The period of open water is given in Chapter I. Many of the lakes are connected by short navigable streams, or short canals, and all the great lake systems in the southern heart of the country are navigated by steamers.

The most important system is that of Lake **Saima** with its connected lakes. Lake Saima itself has railway connexion at Lappeenranta (Villmanstrand) and Vuoksenniska, and

linked lakes to the north meet railways at St. Michel, Nyslott, Joensuu, Nurmes, and elsewhere. But the most important link with Lake Saima is the **Saima Canal** which leads from Viborg to the lake. The canal was completed in 1858, after being talked of since the Middle Ages and even attempted on more than one occasion. The southern entrance is at Juustila at the head of the long narrow Juustilanjärvi, but there is a lock at Lovolo at the southern end of the lake. The total length of the waterway is 37 miles, of which about 20 are canal and the rest a number of small lakes. The minimum breadth of the canal is 39 ft. It is walled with stone except where it is hewn out of the solid rock. There are 28 locks, built of stone, each with a length of 117 ft., a breadth of 24 ft., and a depth of 8½ ft.[1] No lock entails a drop in level of over 11¼ ft.

The locks and the lakes on the course of the canal are as follows :—

Lock 28. Lovolo.
Long narrow Juustilanjärvi.
Locks 27, 26, 25. Juustila.
Parvilainenjärvi.
Locks 24, 23. Parvila.
Locks 22, 21. Särkijärvi.
Taipale drawbridge.
Särkijärvi. Narrow cutting to
Rättijärvi.
Locks 20, 19. Rättijärvi.
Long narrow Lietjärvi.
Locks 18, 17, 16. Lietjärvi.
Locks 15, 14, 13. Great Pälli.
Lock 12. Little Pälli.
Wide, island-studded Nuijamaajärvi.
Lock 11. Räihä.
Lock 10. Turmaja.
Lock 9. Tuohimäki.

[1] Some recent accounts give the length of the locks as 130 ft., the breadth 26 ft., and the depth 10 ft., but these figures are open to doubt.

Locks 8, 7, 6. Lower Mustola. Dock for repairs.
Lock 5. Upper Mustola.
Locks 4, 3, 2. Mälkaiä.
Lock 1. Lauritsala.
Lake Saima.

Since the completion of the canal experience has suggested two improvements. The locks should have been longer and fewer in number. A change of level of 30 ft. in one lock is not too much, so that the altitude of Lake Saima (250 ft.) could have been reached in eight or nine locks. Changes of this nature, however, would amount to rebuilding the canal, and all that has been done is to reduce some of the curves, and to rebuild a second lock at Juustila to cope with the growing traffic. The stone-work of the canal was thoroughly repaired in 1897–1903. The traffic increased from 3,000 vessels in 1886 to 9,000 in 1909 and 10,000 in 1913. It must not be forgotten that the canal is closed for about 4 months every year.

The value to Finland of the Saima canal was greatly enhanced by the subsequent cutting of numerous short canals to connect closely adjacent lakes to Lake Saima. In fact without these canals the larger one would have been of comparatively small value. In 1861 a canal was opened through the isthmus of Oravitaipale, on the north-east of Lake Haukivesi, allowing communication from Nyslott towards the east to Joensuu. From 1865 to 1876 were constructed the canals of Taipale, Konnus, Ahkionlaks, and Nerkoo. Most of their locks have the same dimensions as those of Saima (117 ft. long), but some are 164 to 193 ft. These canals now permit through communication from Viborg to Kuopio, Iisalmi, and Kiuruvesi. To the south-east of Kuopio also several canals have been built which allow a second route from Nyslott to the east of the large island of Soisalo. In 1883 the canalization of the Pielisjoki between Lakes Pyhäselkä and Pielisjärvi was completed. This entailed the cutting of 18¾ miles of canal and the construction of eleven locks, four of which are built of stone. The length of the locks (117 ft.) is

the same as that of the Saima locks, but their width (25¼ ft.) is a little greater. They have a minimum depth of 6½ ft. Expectations have not been reached in the volume of traffic on the Pielis canal although it taps Nurmes and all the important district to the east of Lake Pielisjärvi. Certain unspecified improvements are said to be necessary. Lastly there are the short canals from Lake Saima to Lake Louhivesi and from Lake Louhivesi to Lake Pähkeenselkä which put St. Michel into connexion with Lake Saima.

The chief lines of traffic on the Saima lakes are as follows, but it is impossible to give the exact course to be followed or more than the approximate mileage, for the tracks are known only by the local pilots without whose help the navigation would be most dangerous, if not impossible.

To St. Michel.—Lake Saima, Kirkko canal, Varkka canal (¾ mile), Lake Louhivesi, St. Michel canal (1 mile), northward along Lake Pähkeenselkä, St. Michel (railway). Total distance 70 miles.

To Nyslott.—Lake Saima, Kutvele canal (½ mile), Lake Halinvirta, Puumala, Lake Haapavesi, Lake Tolvanselkä, Lake Lepistönselkä, Lake Pihlajavesi, Nyslott (railway). Total distance about 85 miles. West of the route there are alternative courses, equally intricate.

Nyslott to Putikko (railway) and Lake Puruvesi, north or south of Laukansaari Island.

Nyslott to Kuopio.—Lake Haukivesi, Oravi canal (1 mile), Varkaus, Lake Unnukka, Lake Koirusovesi, Lake Kallavesi, Kuopio (railway). Total distance, 100 miles. An alternative route is: Lake Haukivesi, Oravi canal (1 mile), a bewildering archipelago north thereof, Pilppa canal, Lake Ruokovesi, Lake Kermajärvi, thence by Kokmasalo channel with two short canals to Lake Suvasvesi, and by Vehmersalmi channel to Lake Kallavesi and Kuopio (railway). Total distance about 115 miles.

Kuopio to Iisalmi.—Lake Kallavesi, Lake Ruokovesi, Ruokovirta canal, Lake Maaninganjärvi, Ahkionlaks canal (1¼ miles) (or by Tomperi and Vianto canals), Lake Onkivesi, Nerkoo

canal (1 mile), Lake Nerkoonjärvi, and along railway to Iisalmi (railway). Total distance about 60 miles.

Iisalmi to Kiuruvesi.—Lake Porovesi, Lake Haapajärvi, canalized Kiurujoki, Lake Kiuruvesi, Kiuruvesi (no railway). Total distance about 22 miles.

Nyslott to Joensuu.—Lakes Haukivesi, Oravi canal, Enovesi, Pyyvesi, Orivesi, Humeenselkä, Jänisselkä, Pyhäselkä to Joensuu (railway). Total distance about 90 miles.

Joensuu to Nurmes.—By canalized Pielisjoki, touching railway at several points, Lake Rahkeenvesi, Uimaharju (railway crosses), Lake Rukavesi, Lake Pielisjärvi, with railway near eastern side to Nurmes (railway). Total distance about 110 miles.

The Saima lake system affords other steamer routes beside those mentioned, but Nurmes and Kiuruvesi to the north, Joensuu and Uimaharju to the east, and St. Michel to the south-west, are the extreme points that can be reached. There are pilot stations at Lapeenranta, the St. Michel canal, St. Michel, Puumala, Nyslott, the Oravi canal, Savonrata, and Joensuu ; also at Varkaus, Leppävirta, Kuopio, Ahkionlaks canal and Iisalmi.

Lake **Päijänne** is not connected with Lake Saima or directly with the sea, but forms an important waterway. The Vesijärvi canal, one mile long, with a lock (built in 1868), connects Lake Päijänne with Lake Vesijärvi, and so allows through traffic between Lahti (railway) and Jyväskylä (railway), a distance of about 100 miles. These are the only places with railway connexions on the lake, but there are numerous important villages on the banks. There are pilot stations at Lahti, the Vesijärvi canal, Edessalo at the entrance to Lake Tiirinselkä, Kirkkolahti, Jyväskylä, and Heinola. Steamers can pass from Lake Päijänne to the south-east down the canalized Kyminjoki to Heinola. The rapids at the entrance to the river are avoided by the Kalkis canal, one mile long, built in 1878. From Heinola vessels can pass to Lake Konnivesi, but through traffic ceases at the exit of the Kyminjoki from that lake (see p. 131). The volume of

traffic which passes along Lake Päijänne can be gauged by the steady increase in the number of vessels using the Vesijärvi canal, which was so great that in 1910 the canal was rebuilt. The Päijänne canal system is open to vessels drawing $5\frac{3}{4}$ to $6\frac{3}{4}$ ft.

It was suggested some forty years ago to link the Päijänne navigation with that of the group of lakes to the north, Leppävesi, Kuuvesi, Konnevesi, Keitele, Iisvesi, Nilakka, and Pielavesi, but the project was abandoned and Iisvesi was connected by a branch railway with the Kajana line. Since then, however, some improvements have been made in the navigation of this series of lakes. The Kolu canal ($1\frac{1}{4}$ miles) joins Lakes Nilakka and Iisvesi, and the lockless Säviä canal joins Lake Nilakka to Lake Pielavesi. The Simuna canal joins Kynsivesi and Kuuvesi, the Kuusa canal joins Leppävesi with Vatiajärvi, and the Luja or Kapee canal joins Vatiajärvi to Kuhnamajärvi on which is Äänekoski (railway).

The third great system of navigable lakes is in western Tavastland and centres round Tammerfors and Lake **Pyhäjärvi.** These drain by the Kokemäenjoki (Kumo) to the Gulf of Bothnia, but there is no through steamer navigation to the sea. The lake navigation has railway connexion at several places, notably at Tammerfors, Tavastehus, and Vilppula, which put it in direct communication with ports on the west and south of Finland, the north line to Torneå, and the cross-line via Jyväskylä and Nyslott to Lake Ladoga and Viborg.

There are pilot stations at Waakaniemi and Tammerfors on Lake Näsijärvi, Viiala on Lake Kouhonselkä, and at Tavastehus. Several short canals have been constructed, and there is now a through waterway from Lake Toisvesi in the north, via Lakes Vaskivesi, Tarjannevesi, and Ruovesi, Koutu canal, Lakes Pulovesi, Muurole canal, Lake Vankavesi, and Lake Näsijärvi to Tammerfors. The isthmus on which Tammerfors stands is cut by a channel, and traffic can pass via Lakes Pyhäjärvi, Palkonselkä, Toutosenjärvi, Kouhonselkä, Vanajavesi, and up the Vanajavesi to Tavastehus. From Tavastehus there is water communication by the River

and Lake Vanajavesi, the Valkiakoski canal (lock), Lakes Mallasvesi and Roine, Kaivanto canal, Lake Längelmävesi to Orivesi (railway) and Längelmäki and other small places on the eastern side of the lake, with no railway connexions. Vessels drawing 5¾ ft. can use the Pyhäjärvi waterways.

Several of the other lakes of Finland have steamers on them, including Ätsarijärvi and Oulujärvi (see Uleå River, p. 130). Lake Inari, in northern Lapland, has so far no steamers.

Lake **Ladoga** is navigated by several lines of steamers in all directions. The Finnish shores are well lit, especially on the north-west, and there are pilot stations at Taipale, Sortanlahti, Kexholm, an island off Sortavala, Syskyä, near the mouth of the Syskyänjoki, and the islands off Salmi at the mouth of the Tulomajoki. In addition to smaller unwatched lights there are lighthouses at Sortanlahti and on the islands of Heinäluota and Hanhipaasi, and a lightship at Taipale, the entrance to the River Vuoksi. The Heinäluota light is fixed white, 84 ft. above sea-level. Hanhipaasi has a flashing white light which is 98 ft. above sea-level. The Sortanlahti light is fixed white and red, 31 ft. above sea-level. There are several Russian lighthouses on the south-east side of the lake, of which the most important is Bugri light, about seven miles east of the mouth of the Neva.

Roads

Nature and State of Roads

Finland is well supplied with roads linking all the main centres, and there is a profusion of by-roads in all directions. Between most places there are alternative routes. Roads are naturally most numerous in the south and decrease in number towards the north of the country. Road traffic replaces river and canal traffic in winter.

In Lapland there are few roads and they have only a short season of usefulness. In winter sledge traffic can pass over the hard frozen snow in any direction where the gradients and the absence of trees permit. In early summer the Lapland

roads, even if corduroyed, are liable to be impassable owing to the swampy nature of their beds.

The main or post roads have a total mileage of over 27,000 miles. Owing to their great number no itineraries of these roads are added to this book, but a few general features may be described. The main roads, some of which date from several centuries ago, must by law be either 15 ft. 7 in. or 23 ft. 5 in. wide. Many of the older ones are not less than 46 ft. wide. Trees and shrubs near them are cut down. They are kept in repair by the owners of the land through which they pass. By-roads are 11½ ft. wide, and their upkeep is the duty of the parish. All important roads are marked with kilometre posts. The main roads generally have an excellent surface, but the by-roads are indifferent or thoroughly bad and quite useless for heavy traffic.

Most of the roads, including the best ones, wind needlessly and have not been constructed with a view to easy gradients. They often mount *åsar* instead of avoiding them, and, in addition to the bends which the broken nature of the surface demands, deviate to pass by tiny villages of no importance.

Some of the larger *åsar* in the south of the lake plateau, however, have roads along their tops, and these roads being well drained are generally in good condition. On the coastal plains the main roads to the interior generally follow, more or less, the river valleys. This is especially the case with the larger rivers, and often entails much winding. There is little or nothing in the physical features of these plains to prevent the roads going direct from town to town, and their courses are determined by the location of the villages which cluster along the rivers.

A good but a very winding road roughly follows the coast from the Russian to the Swedish frontier. It is often at a considerable distance from the sea, as it cuts across from the head of one fjord to the next. There are, however, branch roads to practically every sea port and landing place.

On the lake plateau the course of the roads is determined by the disposition of the lakes, which means that it is easier

to travel north-west and south-east than from south-west to north-east. Almost every isthmus and constriction in the lakes is taken advantage of for a road, and this often entails a ferry, but nevertheless the mileage between neighbouring towns is often considerable, and few routes are direct.

The chief roads in Finland are carried over rivers on wooden or stone bridges. Few of the bridges are of iron. In some cases bridges have been constructed to carry the railway as well as the road, as between Uleåborg and Torneå. Ferries are few in number except on the lakes.

Wheeled traffic is of comparatively recent use in Finland, In the Middle Ages all traffic was on foot and by pack-horse —very often along narrow bridle-paths, constructed, where they crossed a swamp, of tree trunks laid end to end and two abreast. Even to-day wheeled vehicles in Finland are of a somewhat primitive character and generally devoid of springs. Two-wheeled carts, of little carrying capacity, are most in use. In the Viborg district more commodious four-wheeled vehicles are to be seen.

On the main roads there are posting stations, on an average, every 7½ miles, where horses are kept for travellers. The person in charge of a post-house has the right to requisition the horses of the neighbouring peasants in case of need. The tariff for posting is fixed by law and is at the rate of a little over 2*d.* a mile.

Easy water routes in most directions never encouraged the building of good roads. Most of the inland traffic now goes by water or rail, and the roads are little used except where no better line of communication exists, or for purely local traffic.

Lapland routes

In winter, when the ground is covered with snow, the worst features of the roads are less disadvantageous, and sledge traffic takes many short cuts. In Lapland all heavy traffic moves at that season. During the winters of 1915–16 and 1916–17 bulky imports for Finland, and heavy munitions *en route* for Russia entered Lapland by several routes, from

the Atlantic, the Arctic, and the White Sea and were sledged to the Finnish railheads.

The first route is from Skibotten on Lyngen Fjord on the coast of Norway through Enontekiö to Palojoensuu on the Muonionjoki and thence by road to the railhead at Torneå. An alternative to the latter part of this route is eastward by road to Sirkka on the Ounasjoki and thence by road along the Ounasjoki to Rovaniemi. It is proposed to extend the road to Skibotten, and there has been talk of a railway. Reindeer are used on this route. The following are the approximate distances.

miles	
0	Skibotten. Norwegian seaport.
25	Possuvaari. On frontier.
87	Palojoensuu. Road begins.
118	Muonioniska.
284	Torneå. Railway.

Alternative road from Muonioniska.

118	Muonioniska.
154	Sirkka.
166	Kittilä.
262	Rovaniemi. Railway.

The second route is from Varanger Fjord on the Murman coast. Several ice-free ports are used for this traffic. The Norwegian ones are Bugö on Bugö Fjord, and Kirkenes on Bog Fjord. From both ports the Lapp sledge track is along the east of Lake Inari to Kyrö at its south-east corner. From Kyrö there is a road via Köngäs and Sodankylä on the Kitinenjoki to the railway at Rovaniemi. The Kirkenes route in 1915–16 was used for cotton for the Finnish factories and worked by horses. Each sledge carried 1,500–2,000 lb. and it was hoped by the winter of 1916–17 to increase the number of sledges to 150 a day. The Bugö route, worked by reindeer, was used for minor traffic. In each case the journey to Kyrö took four to five days and the return journey, with

empty sledges, about a day less. Munition traffic went by the Russian port of Pechenga on the Murman coast, to Kyrö.

The following are the approximate distances :

miles		miles		miles	
0	Bugö	0	Kirkenes	0	Pechenga
110	Kyrö	95	Kyrö	120	Kyrö
170	Köngäs	155	Köngäs	180	Köngäs
205	Sodankylä	190	Sodankylä	215	Sodankylä
280	Rovaniemi	265	Rovaniemi	290	Rovaniemi

The road is in good condition between Kyrö and Rovaniemi, and said to be possible for motors. North of Kyrö it is a corduroy road in many parts and fit for driving but too rough and hilly for heavy traffic. During summer it is liable to interruption owing to the swampy nature of the ground.

Several routes lead from Kandalaksha on the White Sea to Finland. They are fit for light wheeled traffic. One road goes westward by Kuolajärvi to Kemijärvi (Kemiträsk) whence there is a fair road, undulating and rough in places, to Rovaniemi. In winter the whole journey is done by sledges. There are rest houses on the road. The approximate distances are as follows :

miles	
0	Kandalaksha.
85	Kuolajärvi.
135	Kemijärvi.
180	Rovaniemi. Railway.

A second road, also provided with rest houses, goes north-east from Uleåborg by Kuusamo and Paanajärvi to Kandalaksha, and a third goes from Uleåborg by Utajärvi and Kivelia to Kem, a total distance of about 280 miles.

Railways

All the chief ports of Finland, from Torneå to Viborg, have railway connexions. The Finnish and Swedish railway systems meet at the frontier on the Tornionjoki. Passengers and

mails are transferred from Torneå in Finland to Haparanda in Sweden by steam ferry in summer and by a road over the ice in winter. The lines are not yet linked up, though a railway bridge at Torneå was sanctioned in July 1916.

The Finnish and Russian lines meet at the frontier between Viborg and Petrograd. The Finnish frontier station is Terijoki, 11 miles from the actual boundary at Valkeasaari (Russ. Byelo Ostrov), which is the Russian frontier station. There is a coast line from the Russian side of the frontier, some four miles south of the main line through Sestroryetsk to Petrograd (Sestroryetsk station). The terminal stations of this line are Kurort on the sea, and Dyuni on the frontier, one mile from the sea. The project to extend the Dyuni branch through Finnish territory to the main Viborg–Petrograd line had not been carried through by May 1916, although the completed line is shown on many maps. There is, however, a narrow-gauge line from Valkeasaari to Dyuni, which is said not to be joined to the coast-line in question.

The Finnish and Russian railways in Petrograd, which were formerly connected only by a temporary line laid over the Alexandrovski bridge, are now linked by a connecting line round Petrograd over a new bridge across the Neva. For this purpose the Finnish Government in 1908 was persuaded to vote a sum of £200,000.

The main lines of the Finnish railways keep well away from the coast, except in the north of the Gulf of Bothnia, at Viborg and in the neighbourhood of the Finno-Russian frontier. Branches run from the main system to the ports. From the main line east and west in the south of Finland three important lines run north, namely, Viborg–Nurmes, Kouvola–Kajana, Tammerfors–Karunki. These are roughly parallel to each other and to the coast, and are connected by a cross-route from Elisenvaara, via Pieksämäki to Haapamäki, which has recently been completed. The railheads of the three northern lines are not connected by rail, but there are roads between them. The route from Hiitola to Kexholm, part of an alternative and inland route from Petrograd to Finland, is probably

now finished. This line goes via Kaarlahti, Kexholm, Pyhäjärvi, Kiviniemi and Rautu to Raasuli, about 70 miles, and from thence to Petrograd, about 40 miles more.

The line from Elisenvaara to Haapamäki, the last to be completed, would allow Russia rapidly to concentrate troops at Nikolaistad (Vasa), Jakobstad, and other ports at the narrowest part of the Gulf of Bothnia, where an attack on Sweden would be most feasible, and if successful would probably result in the capture of the railway via Gällivare to Narvik on the coast of Norway. Similarly the line from Petrograd to Åbo would allow Russia another line of attack on Sweden via the fortified Åland Islands.

Proposals have been made to connect Rovaniemi with the Murman railway on the White Sea or via Sodankylä in Lapland with the Murman coast or Varanger Fjord in Norway. A German proposal was made in 1918 for a train ferry between Reval and Helsingfors.

Other lines projected by the Finnish Diet are as follows: Ylivieska to Iisalmi, 97 miles; Lahti to Heinola, 22½ miles, with prolongation to Jyväskylä; Åbo to Nystad, 42 miles; Åbo to Riihimäki, 100 miles, Viborg to the outport of Koivisto (Björkö), 27½ miles, and Uleåborg up the Oulunjoki to Vaala, 56 miles. Some of these, as the line from Iisalmi to Ylivieska, which is between Gamlakarleby and Uleåborg, would have strategic value, but the Diet had in view the commercial development of the country. Russia in sanctioning these projected lines stipulated that they must not be undertaken until the line from Elisenvaara via Nyslott and Pieksämäki to Jyväskylä was completed (see above).

In 1914 there were 2,505 miles of railways in Finland, of which 217 were privately owned. State purchases have since further decreased the mileage of private lines. No line is foreign owned.

The gauge of the Finnish railways, like that of the Russian, is 5 ft. The narrow-gauge branches and the private lines are generally 2 ft. or 2½ ft. The Swedish gauge is 4 ft. 8½ in. The Finnish lines are all single, except from Helsingfors to

Riihimäki, and from Viborg to Petrograd, where the track is double. The stations are often some distance from the places after which they are named. The stations in the west are particularly well provided with sidings. The only tunnel in Finland is between Karis and Billnäs, but the crossing of the numerous streams and lakes has entailed the building of many bridges, some of which, especially on the Torneå line, are of considerable length. A great deal of the rolling-stock is made at Åbo and many locomotives at Tammerfors. Most of the locomotives, however, are imported from Germany, Switzerland, and Britain.

Only in the southern part of the country, where steel rails are employed, does the permanent way allow speeds approaching 40 miles an hour. On the northern lines nothing over 20 miles an hour is possible. Express trains take 10 to 12 hours to cover the 275 miles from Helsingfors to Petrograd, where the track is at its best, an average of 23 to 27 miles an hour. The cars and the sleeping accommodation are excellent.

In 1917 the rolling stock on the Finnish railways was as follows :

Gauge.	*Locomotives.*	*Carriages.*	*Wagons.*
1·524 m. . . .	570	1,356	17,494
·78 m. . . .	2	2	31
·75 m. . . .	11	10	220
·60 m. . . .	4	3	104

Of these 560 locomotives, 1,346 carriages and 17,310 wagons, all of standard gauge, belonged to the State.

During the last four or five years before the war Russia insisted that all new railway work in Finland must be built to allow the use of Russian rolling-stock, which though of the same gauge as the Finnish stock is considerably heavier.

Comparing the length of the railways in relation to the number of inhabitants, Finland is on a level with France, Great Britain, or Belgium—roughly, 10 kilometres (6¼ miles) to every 10,000 of the population. But in everything else—rolling-stock, speed, track, &c.—it is inferior to the secondary

lines of the more important countries. Moreover, the fuel is usually wood, which takes up so much space that continual long stops are inevitable for replenishing supplies. Coal is gradually replacing wood on the locomotives of the more important long-distance trains.

The railway system of Finland is of special importance in the development of the country. Its growth during recent years has been seriously affected by the political situation. The general strike of 1905 was started by the railway employés. They resented the appointment of a Russian colonel, who knew neither Finnish nor Swedish, as chief administrator. The labour troubles that followed the strike resulted in a large increase of wages, which has naturally affected railway finance. The damage to Finnish railways during the recent revolution is estimated to amount to Fmk. 9,000,000, and includes the destruction or partial destruction of 43 bridges.

Telephones

Since its introduction in 1880 the telephone has spread throughout the country, except Lapland. In 1910 it went no farther north than Rovaniemi and Kemijärvi, but has since been extended (see below under Telegraphs). All the towns and practically all the villages, as well as many isolated farms and saw-mills, now have telephones. Throughout the coast region there is telephonic communication. In a general way the interior is connected by the most direct route with the coast, but there are several cross-routes which have still to be completed before there is continuity between east and west in the heart of the country. The chief centres are Helsingfors, Åbo, Viborg, Tammerfors, and Vasa. The telephone system of the Åland Islands is not linked with that of the mainland.

The telephones are all owned by private companies. The State owns a few that run along the railways, but these are not open to the public. There are also a few private Russian telephone lines. The wires of the Finnish telephone system are generally overground and laid along the roads, but in Helsingfors, Abo, and Viborg a few wires are underground.

Most of the lines are single wires, except in the towns, where double ones are taking their places. The telephone apparatus is all of Swedish manufacture. Special buildings have been erected for the telephone exchanges in the towns; but in the villages, shops and inns serve the purpose. The service is open from 7 a.m. to 9 p.m., but is closed at night, and in some cases on holidays. In the large towns, however, it is always open.

Since 1909 there has been a link between Viborg and Petrograd. There is apparently no connexion to Sweden (1916).

Telegraphs

In 1856 Russia laid the first telegraph line in Finland—from Petrograd to Åbo—and since then she has retained control of the whole system. The wires have been laid along the chief railway lines, and in a few cases along main roads. This facilitates both construction and upkeep. There are telegraph offices in all Finnish towns, but few in the country, and the use of the telegraph in the rural parts of Finland is nothing like as widespread as that of the telephone. In addition to these Russian lines, and generally side by side with them, are the wires belonging to the railways. These, which are entirely under Finnish control, are open to public use, and their total length is about equal to that of the Russian lines, About half the number of stations and halts on the railways have telegraph offices.

A Russian military telegraph, which can be used also for telephonic purposes, follows the road from Rovaniemi to Pechenga, where it connects with the line to Murmansk. There are telephone stations on this line at Vuotso, Sodankylä, Onnela, and Rovaniemi. Another Russian military telegraph was constructed early in the war from Rovaniemi to Kandalaksha on the White Sea via Kemijärvi and Kuolajärvi. The section in Russian Karelia was destroyed in 1917 but the Finnish part remains.

There is also telegraphic connexion with Russia via Petrograd, and by a Russian cable from Helsingfors to Reval.

From Nystad there are two cables, belonging to the Northern Telegraph Company, to Grisslehamn in Sweden, and another, belonging to the same company, from Mariehamn in the Åland Islands to Grisslehamn. The Åland Islands are connected with Finland by a Russian cable from Geta in the north of Åland (connecting by land with Mariehamn) to Nystad. The island of Hogland has a cable to Kunda Bay, and Seitskär has one to Kurgalski Point (Kourgoula) for Narva. Both these are Russian, and neither island has direct communication with Finland.

There are wireless stations at Åbo, Hangö, Viborg, and Helsingfors. The last two are Admiralty stations only.

Mariehamn has a wireless station to communicate with the outlying Bogskär lighthouse, and at Presto, opposite Bomarsund, there is one with a range of 47 miles. It is probable that other wireless stations were built during the war, especially in connexion with the fortifications in the Åland Islands.

CHAPTER XI

THE ÅLAND ISLANDS

Topographical Features—Climate—Vegetation and Animal Life—People and Language—Occupations—Roads—Fortifications

Topographical Features

The Åland Islands lie between Finland and Sweden at the entrance to the Gulf of Bothnia, and have a total land area of 540 square miles. The chief island is Åland, or Mainland which, with an area of over 200 square miles, is the largest island in Finnish waters. It is about 30 miles from north to south and 17 miles from east to west, but these measurements do not give a true idea of its extent, since it is deeply cut by long fjords which all but divide it into several islands. Near Åland, and separated from it by narrow straits, are several large islands, Eckerö to the west, Lemland and Lumparland to the south-east, and Vardö to the east. Enklinge, Kumlinge, Seglinge, Sottunga, Föglo, with other islands around it and Kökar also belong to the Åland group, but lie some distance to the east of the chief islands, and really have a position intermediate between the Åland Islands and the Åbo Archipelago. Beyond and around all these islands lie some 200 smaller ones, and countless rocks. To the south-west and the north the open sea comes nearest to the main island, but outlying isolated islands, as Lågskår, stand out into the Åland Sea, and Hellman and others into the South Quarken. There is not 10 miles of open sea between the Åland Islands and the outermost islands off the Swedish coast.

Practically all the islands are granitic and have abrupt coasts of bare rock. The surface is most irregular and averages about 100 ft. The greatest elevations in the archipelago are only 430 ft. in Orrdalsklint, 370 ft. in Strömma Kasberg, and

about 330 ft. in Getaberg, all in Åland. The north coast of Åland is higher than the others, but its waters are foul with many rocks.

The charts of these islands are not altogether trustworthy: this is especially true in the north. A resurvey of the islands has been in progress in recent years, but the intricacies of navigation in the Åland Islands are understood only by the local sailors and fishermen and a few Russian naval officers. Pilots can usually be found at the outlying islands (see *Baltic Pilot*, iii). Among the many anchorages the best are Fögle Fjord, Utö, Svibyvik (Mariehamn), Eckerö Fjord and Lumpar Fjord. Lemström canal, about 200 yards long, 40 ft. wide, and 13ft. deep, has been cut through the isthmus that connects Lemland with Åland and affords a short cut from Mariehamn to the east.

Climate

The climate of the islands is a modified form of that of Finland, with more open winters and cooler summers (see Chapter III). The mean annual temperature is 1·8° F. higher at Mariehamn than at Helsingfors, but the range is considerably less. February is the coldest month. At Bogskär the mean temperature of that month is 32·6° F., and at Mariehamn 24° F. October is the month of greatest precipitation, not July or August as in the south of Finland. Snow is never deep, and seems not to exceed a maximum depth of 16 inches. Night frosts in summer are rare—a very important fact for the farmers. Spring comes about a fortnight earlier than around Åbo. Summer is warm but temperate, autumn long and fine. Mariehamn harbour is never closed by ice and is often used in winter as a harbour of refuge by ships running from the drifting pack-ice in the Åland Sea. Many of the channels of the archipelago can be navigated till late in the winter, and the ice that forms in the western harbours can easily be broken by an unprotected vessel. But towards Finland the sea is frozen every winter from January to March. At Bogskär and Utö, however, the ice does not form till late

February or early March. Only in nine winters last century was the Åland Sea sufficiently frozen to allow traffic to cross it between Finland and Sweden.

Vegetation and Animal Life

The mild climate makes the vegetation richer than on the mainland, and the presence of calcareous soils adds greater variety to the plant life. Forests of pine, spruce, and birch, mixed with aspen, are common, but some islands are bare of trees. There are none on Kumlinge and adjoining islands, or on Kökar. Trees on Åland do not grow tall, but they are vigorous nevertheless. Åland and other islands have also small woods of oak, and the elm, ash and other trees of Finland also occur. On the outer islands there are many juniper bushes and alders. Wortleberries and blackberries are common. In the sheltered bays and valleys, protected from the westerly gales, there are meadow lands which provide winter forage for the cattle.

Sea birds swarm all round the islands, and many of them nest there. The wolf, lynx, and elk have died out.

People and Language

The people of the Åland Islands are mainly Swedes. Only 4 per cent. of the people are of Finnish origin. These proportions change towards the Åbo archipelago until in the large islands near the mainland they are reversed and 90 per cent. of the population are Finns. The Åland Islanders at a far remote time must have come from Sweden, but there are no records of the migration. In Åland, where the race has been least mixed with Finnish blood, the people have a larger stature than elsewhere and are comparable in this respect with the inhabitants in the Roslagen district of Sweden, west of the Åland Sea. Swedish is the language in use. Formerly the Åland Islanders spoke a peculiar dialect, but this is dying out in favour of the commoner form of the language. In Mariehamn some Finnish is probably under-

stood, and owing to the many men who have been deep-water sailors on foreign ships it is not unusual even on the remoter islands to find here and there a man who knows a little English.

For the political history of the Åland Islands see Chapter VI.

Occupations

The total population of the Åland Islands is about 20,000, of which about two-thirds live on the island of Åland. About 80 of the islands are inhabited. The greater part of the population is engaged in fishing and sea-faring. Trade between Sweden and Finland occupies many of the islanders. Åbo–Mariehamn–Stockholm is the great trading route through the islands both for sailing vessels and steamers. Most of the route is well buoyed and lit. In 1908 there were over 200 vessels owned in the Åland Islands, with a total tonnage of nearly 60,000 tons. But forty to fifty years ago before steamers had come on the scene this was a more lucrative occupation. Fishing is another important occupation of the people, but is only pursued on a large scale in the outer islands where cultivable land is scarce. Very often on the larger islands during hay-making or harvest it ceases altogether and never provides for much more than home needs. On the outer islands, however, fishing is the chief and sometimes the only occupation. A small species of herring is the principal fish and is caught in large and small nets. Many cod are caught on lines. On account of the sudden gales and heavy nets fishing is an arduous occupation and not free from considerable danger, but the women nevertheless take part in it. The spring herring is salted for sale at Åbo and Reval, and the autumn herring at Helsingfors. Among the outer islands birds of passage are often shot in spring for food, but nesting birds, on the other hand, are carefully protected as their eggs are an important source of food. Colonies of eider-ducks are to be found on some of the islands, Åland, Lågskär, Klåfskär, and Signilskär. The valuable down is collected and sold in Sweden. Seal-hunting is also important. The seals are shot

on sandbanks and reefs or in winter on the ice. The insecurity of the ice round the Åland Islands makes this a dangerous occupation and the sealers are sometimes carried out to sea and lost.

The prevalence of boating and fishing has always made the Åland Islanders good sailors, and many of the men go to sea on foreign merchant ships and have a few years' wandering before settling down. In recent years, however, as the share of the Åland Islands in the trade between Sweden and Finland has become smaller, increasing attention has been paid to agriculture and cattle-raising.

In the larger islands agriculture is now the principal occupation. The fields are small and separated from one another by rocks and åsar, and although practically all the available land is used the total area is not great. The soil, however, is fertile. Rye, barley, and oats are the principal crops, but some wheat is grown. There are many hay pastures, and cattle-raising is important. A number of co-operative dairies have been started in recent years. Goats are rarely seen. Cattle, meat, and dairy products are sent to Åbo and Stockholm. On the smaller islands there is little scope for agriculture, except some potato-growing for home consumption, while sheep and a few goats furnish wool and meat. Everywhere in the islands the small Finnish horse (see p. 103) is the beast of burden. In winter it often draws carts across the frozen channels between the islands.

The inhabitants of the Åland Islands are hard workers perhaps by force of circumstances, and fairly prosperous. Like most of the inhabitants of Finland they are well educated. There are primary and secondary schools and communal libraries, and colleges of navigation, agriculture, and dairy farming. There is, however, much emigration, particularly from the west, and though some of the emigrants return after a few years, most remain. The majority go to the United States of America.

The population is scattered and the farms isolated. Sometimes there are three or four together, but there are practically no

villages. The only town is **Mariehamn** founded by the Russians in 1861 on the site of a fourteenth-century castle. It lies on the south of Åland on a narrow peninsula between Slemmern and Svibyvik, two long inlets, and reaches from shore to shore, but the western inlet, Svibyvik, is the best approach. There is a wooden jetty with 40 ft. of water alongside, and the port is open throughout the year. The population is about 1,200. There is telegraphic connexion with Finland by a land wire to Geta in the north and thence by cable to Nystad, and to Sweden by direct cable to Grisslehamn. Mariehamn is in wireless communication with Bogskär lighthouse. The town has electric light, but there are no industries. Commodities which the islands do not supply are obtained from Stockholm. **Bomarsund** on the east of Åland is a small settlement (see below).

Roads

Communication among the islands is by boat, but there are a few roads. Except those in Åland, however, the roads are little more than tracks and have no importance. The main road crosses Åland from Bomarsund in the east to Eckerö in the west—total length 19 miles. This road is good and originated in the transport of the winter mails and travellers between Sweden and Finland, which made this part of the journey by land and the rest by water or over ice. The road winds considerably to avoid hills and gulfs but has to cross three inlets on which there are no bridges. There is a branch road, eleven miles from Bomarsund to Mariehamn and through Lemland to Lumpar Strait. The roads are said to be kept in good repair for military purposes.

Fortifications

The Åland Islands were ceded to Russia in 1809 and have since been incorporated with Finland (see Chapter VI). In 1835 the Russians began to fortify Bomarsund, ostensibly with a view to obtaining a comparatively open winter port. The building of fortifications in the Åland Islands is difficult,

for though abundant stone is available, there is little earth. These unfinished fortifications were easily destroyed by the British fleet in 1854. In 1856, when the Åland Islands were restored to Russia, it was with the stipulation that 'the Åland Islands shall not be fortified, and that no naval or military establishments shall be maintained or created on them'. Up to the outbreak of the present war these fortifications had not been rebuilt, but Russian torpedo boats frequently visited Bomarsund, as well as Eckerö and Mariehamn, and a wireless station, not open to the public, was erected on the island of Presto opposite. The range of the station is given as 47 miles.

From 1906 there has been a small garrison on Åland, ostensibly to prevent the importation of arms.

From the outbreak of war, and principally since autumn 1915, Russia was actively fortifying the Åland Islands and on these grounds caused much uneasiness in Sweden (see p. 88). The possession of the Åland Islands gave Russia a safe passage, in her own waters, between the Gulf of Bothnia and the Baltic by passing to their east. From the south the two best channels are (1) by Fögle Fjord, and (2) past Utö and through Stora Skiftet to Delet Fjord. The northern exit, between Saggö and Boksö, or by Saggö Fjord, is well to the west. The only way for Swedish vessels between the Gulf of Bothnia and the Baltic is by the Åland Sea, but as pointed out above the South Quarken is only ten miles in width and dominated by a fortified Åland.

RAILWAYS—ITINERARIES

Summary

The minor branches are inserted in their places on the chief lines.

As a rule only the stations are named and the halts are omitted, but in some of the northern lines, where stations are few, halts are included.

ROUTE I

Abo to Petrograd (358 miles)

miles	
0	**Åbo Harbour.**
2	**Åbo.** Station on the N. side of the town. The general direction of the line is NE., through the most fertile part of Finland, following the r. bank of the Aurajoki.
12½	**Lieto,** alt. 134 ft.
20½	**Aura,** alt. 141 ft. Just beyond here the line crosses the **Aurajoki,** but continues in much the same direction.
28½	**Kyrö.**
36½	**Mellilä,** alt. 259 ft. on the **Niinjoki,** which the line crosses.
40	Crosses the **Karkulanjoki.**
43	**Loimaa,** on the **Loimaanjoki,** which the railway crosses one-third of a mile beyond the station.
49	**Ypäjä.**

miles	
55	**Humppila.**
	Branch SE. to **Forssa,** 14½ miles (gauge 2 ft. 5½ ins.).
	miles
	0 **Humppila.**
	5 **Minkiö,** where the line crosses the **Jänhijoki.** Just before reaching Jokioinen it crosses the **Loimaanjoki.**
	9½ **Jokioinen** (Jokkis), alt. 269 ft. The line runs due east to the bank of the Loimaanjoki, to
	14½ **Forssa,** with a cotton-mill. The town is on the opposite side of the Loimaanjoki.
60½	Crosses the **Kojonjoki.**
61½	**Matku.**
70	**Urjala,** alt. 351 ft., near Vanhajärvi.
71½	Crosses the **Tarpiajoki.**
72½	Alt. 325 ft.
78	Passes the end of Jalantijärvi on the left.
81	**Toijala.** For line to Tammerfors, Torneå, Rovaniemi, see Route IV.
	The line now turns SE.
87	**Kuurila,** alt. 292 ft. Vanajavesi 3 miles to N.
91½	**Iittala,** alt. 322 ft., on Kalvolanjärvi.
100	**Parola,** alt. 212 ft. Lehijärvi about ⅔ mile to the right. A gulf of Vanajavesi continues along the l. side of the line.
104	Line crosses isthmus between lakes.
105	**Tavastehus,** a fair-sized town on Vanajavesi.
113	**Turenki,** alt. 282 ft. on the Vanajanjoki.
117½	**Leppäkoski,** alt. 319 ft., with a lake on the right. Just beyond here the line crosses the **Uittamonjoki.**
119½	Alt. 308 ft.
121	**Ryttylä,** alt. 295 ft.
127	**Riihimäki,** alt. 309 ft., a manufacturing town. For lines to Hangö and Helsingfors see VII and VIII.
	The line to Petrograd now runs NE.

miles	
132	**Hikiä,** alt. 315 ft.
136½	**Oitti,** alt. 298 ft.
138½	A small lake on the right. Alt. 292 ft.
144	**Lappila,** alt. 322 ft., on the Teuronjoki.
148½	**Järvelä,** alt. 328 ft., near two small lakes.
156	**Herrala,** alt. 308 ft. near **Hahmajärvi.**
159	Alt. 272 ft.
164	Branch NE. to **Vesijärvi** on lake, 2 miles.
165	**Lahti,** on Vesijärvi; saw-mills and pulp-factories. Branch N. to **Vesijärvi** (gauge 2 ft. 5½ ins.), 3 miles. Branch S. to **Valkom** (gauge 2 ft. 5½ ins.), 50 miles.

miles	
0	**Lahti.** Line ascends.
2	Alt. 292 ft. Line falls again to coast.
5½	**Pennala.**
6½	Alt. 259 ft.
12½	**Orimattila.**
18	**Pakaa.**
23	**Artjärvi,** alt. 140 ft., with Pyhäjärvi to the left.
25	**Mörskom,** several small lakes to the right.
27	**Porlom.** On leaving line crosses the **Forsbyä.**
31	**Michelspiltom.**
33	**Eskilom.**
34½	**Lappträsk.** On leaving line crosses the R. Lappträsk. Lake Lappträsk is 2 miles NE., Lake Hopomträsk 2½ miles SW.
36½	Recrosses the Lappträsk and follows r. bank.
39	**Skinnarby,** for the southern end of Lake Hopomträsk.
42½	Alt. 29 ft.
43	**Kuggom,** alt. 29 ft. Branch W. to **Rössjö,** 3 miles.
46	**Lovisa,** a small trading town with a harbour.
50	**Valkom.** Large vessels load here.

miles	
169	Alt. 446 ft. Line runs E. by S.
171	**Villähti** alt. 325 ft. Kymijärvi, 1 mile to N.
179	**Uusikylä,** alt. 390 ft.
183	Alt. 362 ft.
190	**Kausala,** alt. 243 ft.
197	Alt. 205 ft.
200	**Koria.**
201½	Crosses the **Kyminjoki** by lofty iron bridge.
204	**Kouvola** alt. 212 ft.

For line to Kajana see Route II.

Branch S. to **Kotka,** 32 miles, and **Fredrikshamn,** 29 miles.

miles	
0	**Kouvola.** Line runs S. near l. bank of the Kyminjoki.
7½	**Myllykoski,** alt. 141 ft.
13	**Inkeroinen,** alt. 98 ft. One mile to W. is Anjala.

Branch SE. to **Fredrikshamn,** 16 miles.

miles	
0	**Inkeroinen.**
7½	**Metsäkylä.** On leaving line crosses the **Summajoki.**
11	**Reitkalli.**
16	**Fredrikshamn,** small seaport.

23	**Tavastila.**
25½	**Kymi.** Line again near the Kyminjoki after taking easterly turn.

Branch SE. to **Karhula,** 3 miles (gauge 2 ft. 7 ins.).

28	**Kyminlinna** halt. Line runs along E. side of narrow peninsula and over a causeway across an arm of the Kyminjoki to
32	**Kotka,** large seaport.

miles	
	The line runs E. through a district of low hills and small lakes, and rises.
211½	**Utti.**
217	**Kaipiainen.** Rautijärvi to left of line.
225	**Kaitjärvi,** alt. 360 ft.
232	**Taavetti,** alt. 308 ft.
239	**Luumäki,** near Kivijärvi.
246½	**Pulsa,** alt. 222 ft. Line turns SE.
253½	**Simola** on the Hounijoki. In region of many small lakes.
	Branch N. to **Villmanstrand** (Lappeenranta) on Lake Saima, 12 miles. Line runs to jetty. Branch line from town to pulp factory at **Kaukas,** on same lake, 2½ miles.
260	**Vainikkala,** on Lake Vainikkala, alt. 125 ft.
261	Alt. 141 ft.
267	**Nurmi,** alt. 72 ft., on the Hounijoki.
271	**Hovinmaa,** alt. 49 ft.
274	**Tienhaara.**
275½	Crosses to the island of Mon Repos.
277½	Crosses gulf again by an iron bridge 77 ft. long.
278½	**Viborg,** the second port in Finland. Saima Canal flows into the head of the gulf, 4½ miles north of town.
	For line to Nurmes, which starts here, see Route III.
	The track is double from Viborg to Petrograd.
284	**Säinio,** alt. 36 ft.
286½	Alt. 39 ft. The line rises slowly.
291	**Kämärä,** alt. 144 ft.
293	Alt. 79 ft.
296	**Galitzino,** alt. 105 ft.
298½	Crosses the **Perojoki.**
303½	**Perkjärvi,** alt. 157 ft.
311½	**Uusikirkko,** alt. 105 ft. Lake 4 miles to the left.
314½	Crosses the **Vammeljoki.**
318	**Mustamäki,** alt. 154 ft.

miles

320 Crosses the **Onkamojoki.**

322 **Raivola,** near a small lake.

Branch NE. to Raivola village, 3¼ miles.

325 **Tyrisevä** halt. The line now runs near the sea.

Branch W. to **Koivisto,** 46 miles.

miles	
0	**Terijoki.** Line follows coast.
3	**Tyrisevä.**
7½	**Vammeljoki.** Line crosses river of same name.
11	**Ino.**
17	**Mesterjärvi,** within two miles of coast.
24½	**Pastakeanlinna.**
32½	**Kuolemajärvi,** at S. end of lake. Line N. to Viborg under construction.
40	**Humaljoki,** at head of Humaljoenlahti, arm of sea.
46	**Koivisto** (Björkö), seaport and naval base.

327 Branch N. to **Puhtula,** 2 miles.

328 **Terijoki,** alt. 98 ft. The station is 1½ miles from the sea. Finnish customs.

331 **Kellomäki.**

333½ **Kuokkala,** alt. 82 ft.

336 **Ollila.**

338½ **Valkeasaari** (Byelo Ostrov), alt. 56 ft., on left of the Siestarijoki, which is the frontier between Russia and Finland. Russian customs.

Branch line S. to powder factory, narrow gauge.

The line now runs inland through marshy country.

342 **Dibuni,** halt.

346½ **Levashovo.**

348½ **Pargolovo,** with branch W. to Pargolovo village, 2 miles.

351½ **Shuvalovo.**

352 **Ozerki.** Branch to Sestroryetsk station on the Bolshaya Neva in Petrograd, 5½ miles.

miles	
353	**Udelnaya.**
355	**Lanskaya.** A loop line runs E. round Petrograd and joins Moscow railway S. of the town.
358	**Petrograd.** Finland station N. of the Neva.

ROUTE II

KOUVOLA TO KAJANA (274 miles)

0	**Kouvola,** alt. 212 ft.
1	Branch NW. to **Kuusankoski** on Kyminjoki, 3 miles.
5½	**Harju.** On right, 1 mile, Lappalanjärvi.
7	Branch SW. to **Mattila** on the Kyminjoki, 3 miles.
12	Crosses the **Torasjoki.**
14	**Selänpää.**
14½	Alt. 302 ft.
	The line turns E. and then runs N. again along the eastern shores of Vuohijärvi. There are many smaller lakes on the right.
25	Bridge over channel between Vuohijärvi and Repovesi.
30	**Voikoski.**
	The line runs along the E. shore of Sarkavesi.
44	**Mäntyharju,** between Pyhävesi and Kalavesi. On leaving line crosses channel. Lakes of all sizes become more and more numerous.
56	**Hietanen.**
61½	**Otava.**
62	Branch NW. to **Röppää** on Puulavesi, 1 mile.
70	**St. Michel,** on Pähkeenselkä. Small town.
78½	**Hiirola** halt.
86	**Kalvitsa.** Kyyvesi lies to the left of the line.
94	**Haukivuori** on Kyyvesi.
101	**Kantala.**
114	**Pieksämäki,** at the S. end of Pieksänjärvi.
	Branch E. to Nyslott and Elisenvaara, see Route V.
120½	Crosses the **Haapajoki.**

miles	
123	Recrosses the Haapajoki.
125	**Haapakoski.** Branch NW. to Haapakoski on Haapajoki; sawmill, 1½ miles.
	Suonteenselkä lies on the right of the line.
138	**Suonnejoki,** at the head of Suonteenselkä.
	Branch NW. to **Iisvesi**, on Lake Iisvesi (4½ miles).
	The railway now winds NE. through a barren country thickly studded with lakes.
146	**Salminen.**
156½	**Kurkimäki.**
163	**Pitkälahti.** Line runs on peninsula into Kallavesi.
170	**Kuopio,** on the peninsula that divides the lake into two parts. It is overlooked by Mt. Puijomäki, 755 ft., on the north.
	Beyond Kuopio the railway runs along a stone embankment over 6,000 ft. long, built right across Kallavesi. The line also crosses several islands and an arm of the lake, the distance from shore to shore being 3 miles. On reaching the shore it enters a cutting through a granite cliff.
178½	**Toivala,** at the western side of Juurusvesi.
185½	**Siilinjärvi.**
195	**Alapitkä.**
196	Crosses the **Kopolanojoki.**
208½	**Lapinlahti,** on Onkivesi.
215½	**Taipale** halt, after skirting Nerkoonjärvi.
223½	**Iisalmi,** on Porovesi. Small town.
229	**Soinlahti**, on Iivesi.
235	**Kauppilanmäki.**
244½	Crosses the **Paloisenvirta.**
245½	**Sukeva,** for Kotijärvi.
247	Recrosses the Paloisenvirta.
252	**Murtomäki.**
274	**Kajana** on the Kajaaninjoki. Small town.

ROUTE III

VIBORG TO NURMES (292½ miles)

miles	
0	**Viborg.** Line runs NE. through thick woods to
3	**Tammisuo.**
5	Crosses the **Perojoki.**
6	**Tali.**
10	**Karisalmi.**
	The railway runs on natural embankment across **Kavantjärvi.**
14	**Kavantsaari.**
19	**Hannila,** for Hannilanjärvi.
23	Crosses **Patalahti.**
	Iron bridge over the **Vuoksi** just before
25	**Antrea.**
	Branch NW. to **Imatra** and **Vuoksenniska,** 24 miles. The line follows the l. bank of the Vuoksi, which however, is out of sight.

miles	
0	**Antrea.**
10	**Jääski.**
15½	**Enso.**
19	**Imatra.**
23½	**Vuoksenniska,** where the Vuoksi issues from Lake Saima.

30	**Koljola.** The country becomes monotonous. Numerous small lakes.
37	**Sairala** on Torajärvi. On leaving line crosses stream.
41	**Inkilä.** On leaving line crosses the **Kuunjoki.**
48½	**Ojajärvi,** on Ojajärvi.
49½	Crosses isthmus between Alasjärvi (W.) and Hittolanjärvi (E.).
57½	**Hiitola.** Line under construction to **Kexholm,** on Lake Ladoga, Raasuli and Petrograd, 110 miles.
59	Crosses the **Hiitolanjoki.**

miles	
64	**Alho.**
70½	**Elisenvaara.** For line to Nyslott, Pieksämäki, Jyväskylä, and Haapamäki, see Route V. Line turns more E., and crosses several small streams.
79½	Crosses the **Ihalanjoki.**
81	**Ihala.**
85½	**Jaakkima.** Branch E. to **Lahenpohja** on Lake Ladoga, 1¼ miles. Line turns more north, crossing the **Vaarajoki** and passing Paigjärvi on the right, then turns NE. to
94	**Niva,** on the Miglisjoki
99	**Kuokkaniemi,** on Kuokkajärvi.
104	Crosses the **Savaanjoki** to
105½	**Tuokslahti** halt, just beyond which it crosses **Humpölänjärvi,** and turns SE. along an isthmus to
110½	**Sortavala,** at N. end of Lake Ladoga. Small town and port. Line turns N. through forest and marsh and skirts Lake Liikola.
115	**Helylä.** On leaving line crosses the **Tohmajoki.**
121½	Recrosses the Tohmajoki.
129	**Kaalamo.**
134½	**Matkaselkä,** on Ruokojärvi, on the west side of which the line runs.
144½	**Pälkjärvi** halt, on isthmus between Kotajärvi (W.) and Pälkjärvi (E.).
149	**Värtsilä,** near the Jänisjoki. Line runs NW. Branch to **Värtsilä** town, 3 miles.
160½	**Tohmajärvi,** 4½ miles N. of the lake.
173½	**Tikkala** halt, after skirting Särkijärvi.
179½	**Hammaslahti,** with several lakes round. Line runs near Pyhäselkä to
192½	**Joensuu,** situated where the Pielisjoki enters Pyhäselkä. The railway does not enter the town, but crosses the **Pielisjoki** east of town and runs N. to

miles	
202½	**Kontiolahti,** on E. shore of Lake Höytiäinen, which lies to the left of the line. Line turns E. to
206½	**Jakokoski.** Line turns NE., and ascends valley of the Pielisjoki.
214	**Kaltimo,** on the Pielisjoki.
221	Crosses the Pielisjoki.
222½	**Uimaharju,** E. of the Pielisjoki, which is very broad here. Line turns N. by E.
229	**Haapalahti** halt, 2 miles from Pielisjärvi.
233	Crosses the **Kälvänjoki.**
236	**Kälvä** halt, on shore of Kälvänjärvi.
241	Crosses embankment with Pielisjärvi to west and Vuonislahti to east.
243	**Vuonislahti,** on the lake.
246½	Crosses the **Jaakonjoki.**
251	Line turns NW., continuing to skirt Pielisjärvi.
256	Line crosses the wide **Naarasenjoki.**
258	**Lieksa.** Line runs not far from Pielisjärvi to
267½	**Kylänlahti** after crossing the **Viekijoki.**
281	**Höljäkkä.**
287½	**Lipinlahti** halt, on Pielisjärvi.
291½	Crosses isthmus between Lautiaisjärvi (N.) and Pielisjärvi (S.).
292½	**Nurmes,** built on the isthmus. Small town. Road to Kajana.

ROUTE IV

Toijala to Torneå (458 miles)

0	**Toijala.** Line runs N.
4	**Viiala.** Kouhonselkä on the right.
11½	**Lempäälä,** on an isthmus between two lakes, after crossing strait.
24½	**Tammerfors,** on the Tammerkoski, a torrent connecting Näsijärvi (N.) with Pyhäjärvi (S.), is the chief manufacturing town of Finland.

miles

Branch N. to wharves on Näsijärvi, 1 mile.

Branch W. to **Björneborg** and **Mäntyluoto,** 97 miles, and **Raumo** 93 miles.

The line runs W. along the isthmus between the Näsijärvi and the Pyhäjärvi, then near the N. bank of Pyhäjärvi.

miles	
0	**Tammerfors.**
10½	**Nokia,** on the Nokemäenjoki.
16	**Siuro.** Line follows N. shore of Kulovesi.
18½	**Kulovesi** halt. The railway runs along a narrow causeway across gulf of lake.
21½	**Pakkala** halt. (Suoniemi). The line cuts across a tongue of land to
27	**Karkku,** at the head of Rautavesi, then runs S. first along a narrow causeway separating this lake from another small one, then along the W. shore of Rautavesi.
31	**Heinoo.**
37	**Tyrvää,** on Rautavesi.
41½	**Kiikka,** on the Kokemäenjoki.
44½	**Äetsä.**
51	**Kauvatsa.** On leaving line crosses the **Kauvatsanjoki.**
54	**Kyttälä**, on the Kokemäenjoki, three branches of which are crossed between here and
56½	**Riste.**
59	**Kokemäki.**
61	**Peipohja.**

Branch WSW. to **Raumo,** 31 miles.

miles	
0	**Peipohja.**
4½	**Voitonen** halt. On leaving crosses the **Köylionjoki.**

miles	miles	miles	
		8	**Kiukainen,** alt. 98 ft., on the **Eurajoki,** which the line crosses. Branch S. to **Kauttua** in Pyhäjärvi, 8½ miles.
		12	**Panelia,** alt. 108 ft.
		16	**Eurajoki,** alt. 76 ft.
		19	Alt. 59 ft. Crosses the **Naarjoki.** Small lakes to left.
		21	**Vuojoki,** alt. 72 ft.
		24	Crosses the **Lapinjoki.** Alt. 43 ft.
		30	**Raumo,** a small port.
		31	**Korkeakari,** on island on N. side of the harbour.
	61		**Peipohja.** The line continues NW. along the l. bank of the Kokemäenjoki.
	67		**Harjavalta.**
	74		**Nakkila.**
	77½		**Haistila.**
	80		**Friitala** halt. The river now makes a sweep to N., the line running direct to
	84½		**Björneborg,** on the l. bank of the Kokemäenjoki, about 3 miles from its mouth. Timber port and the wood-manufacturing town.
	93		**Pihlava.**
	97		**Mäntyluoto,** an artificial harbour, accessible to large vessels. Railway on to quay.
			Tammerfors. The line runs E., passing a small lake on the right, to
29½			**Vehmainen.** The line soon turns NE.
32½			**Kangasala,** about 3½ miles from the village of Kangasala, on **Vesijärvi,** the W. shore of which the line follows at some little distance.
36½			**Suinula,** with three small lakes on the left. The railway now picks its way among a number of small lakes.

miles	
50	**Orivesi,** at the head of Pappilanselkä. Line runs W. of Oriselkä in a N. direction. The country is dreary and uninteresting.
55	Crosses the **Myllyjoki**.
58	Crosses the **Yröhjoki** by a long bridge.
61½	Crosses the **Huikkojoki.**
62½	**Korkeakoski.**
69½	**Lyly** on Lylyjärvi. Line turns N.
79½	**Vilppula,** a mile from the village of Vilppula. Just before reaching it line crosses the broad straits of **Keuruu.**
	Branch E. to **Mänttä**, on Keurusselkä (gauge 2 ft.), 5½ miles.
86½	**Kolho.** The line, after rapidly ascending an embankment, crosses a wide arm of Keurusselkä.
95½	**Haapamäki,** with several small lakes in the neighbourhood. Line turns NNW.
	For line to Elisenvaara, via Jyväskylä and Nyslott, see Route V.
103	**Pihlajavesi,** with lake of Pihlajavesi to the left.
116	**Myllymäki.**
	Line turns WNW. through wooded country.
120½	**Inha,** between Välivesi (N.) and Hankavesi (S.).
124½	**Ostola,** at the head of Ouluvesi.
130	**Töysä** halt. Line passes head of Hakojärvi.
	The line is now running WNW. among a number of small lakes.
137	**Tuuri.**
140	Crosses the **Lapuanjoki.**
141	**Alavus.**
154	**Sydänmaa.** After passing S. end of Kuorasjärvi.
158	**Koura** halt. Line runs NW.
158½	Crosses tributary of Sulkavanjoki.
159	Crosses the **Sulkavanjoki.**
167½	**Seinäjoki.** Important junction.
	Branch NW. to **Nikolaistad** (**Vasa**) and **Vasklot,** 49 miles.

miles	miles	
	0	**Seinäjoki.**
	4½	Crosses the **Kyrönjoki** by a long bridge, entering Österbotten, where there are few marshes to interrupt the fields and meadows.
	13½	**Ylistaro.**
	18½	**Orismala.**
	26½	**Tervajoki,** near the Kyronjoki.
	27½	Crosses the **Tervajoki.**
	32	**Laihia,** on the Laihianjoki.
	37	**Toby,** near the Laihianjoki.
	41½	**Korsholm.**
	46	**Nikolaistad (Vasa)**, an important town with three harbours.
	49	Island of **Vasklot,** for the harbour.
		Branch WSW. to **Kaskö,** 68 miles, and **Kristinestad,** 69 miles.
	0	**Seinäjoki.**
	6	**Tuomikylä** halt.
	10	**Ilmajoki.**
	14½	**Koskenkorva.** Line crosses the **Kyrönjoki.**
	20½	**Kurikka.**
	33	**Kauhajoki.** Line turns W.
	39	**Kainasto.**
	48½	**Teuva.**
	53½	**Perälä.**
		Branch S. to **Kristinestad,** 15½ miles.
	miles	
	0	**Perälä.**
	5	**Mörtnark** halt.
	11½	**Tjöck** halt.
	15½	**Kristinestad.** Seaport.
	61	**Närpes.**
	62	Line crosses the **Närvejoki.**
	68	**Kaskö.** Line ends at wharf opposite town.

miles

The line runs N. over a level country. Between Seinäjoki and Uleåborg there are 121 bridges.

170½ **Nurmo.**

171 Crosses the **Sulkavanjoki.**

181½ **Lapua,** after crossing the **Lapuanjoki.**

190½ **Kauhava.** On leaving line crosses **Kauhavanjoki** and turns NNW.

201½ **Härmä.**

The railway now runs along the r. bank of the Lapuanjoki.

205 **Voltti.**

215½ **Jeppo.** Line turns N. and leaves river.

223½ **Kovjoki.** Line turns NE.

Branch W. to **Nykarleby** and the sea, 7 miles (gauge 2 ft.).

miles	
0	**Kovjoki.**
5	**Nykarleby.**
7	**Marielund** harbour : jetty.

225½ Crosses the **Kovjoki.**

229½ **Bennäs.** Line approaches coast.

Branch NNW. to **Jakobstad** and the sea, 10 miles.

miles	
0	**Bennäs.**
2½	Line crosses the **Kovjoki.**
7	**Jakobstad.** Seaport.
10	**Alholmen** port—many sidings.

230¾ Crosses the **Purmoå.**

233¾ Crosses the **Esseå.**

234 **Kållby.**

242 **Kronoby.**

242½ Crosses the **Kronobyå.**

250½ **Gamlakarleby,** seaport.

Branch W. to **Ykspila,** port of Gamlakarleby, 2½ miles.

The railway now turns E.

miles	
253¼	Crosses river.
254	Crosses the **Perhonjoki** by a long bridge.
255¼	Crosses river.
261	**Kälviä.** On leaving line crosses the **Keiojoki.**
275½	**Kannus.** On leaving line crosses the **Lestijoki.**
288	Crosses the **Sievijoki.** Line now running NE.
289	**Sievi.**
299½	**Ylivieska.**
299½	Crosses the **Kalajoki.**
307½	**Kangas.**
317	**Oulainen**, after crossing the **Pyhäjoki.**
324	**Kilpua**, beyond which it crosses a river, and turns N.
333½	**Vihanti,** with several small lakes to the left.
341½	**Lappi.**

Branch W. to **Brahestad** and harbour, 20 miles.

miles	
0	**Lappi.**
7	**Relletti.**
15	**Pattijoki ;** the line crosses the **Pattijoki.**
17½	**Brahestad,** a town with good harbour.
20	**Maivapera Harbour.** Branch 1½ miles S. to Lapalvoto jetty at the end of the peninsula. Sidings to engine-house and sawmill.

345½	Crosses the **Ohtuanoja.**
346½	**Ruukki.** On leaving line crosses the **Siikajoki.**
361	**Liminka.**
362	Crosses the **Temmesjoki.**
362½	Crosses the **Angeslevänjoki.**
369	**Kempele.**
376	**Uleåborg,** large port at mouth of the **Oulunjoki** on l. bank ; line to harbour 500 yds. On leaving line crosses the Oulunjoki.
377½	**Tuira.** Branch W. to harbour of **Toppila,** 1 mile.
384½	**Kello,** on left bank of the Kalimenjoki.
389½	Crosses the **Kiiminginjoki** on an iron suspension

miles	
	bridge with two levels, the upper for the railway, the lower for road traffic.
390	**Haukipudas.**
396	Crosses the **Liedesjoki.**
398½	**Ii** on l. bank of wide Iijoki. Line crosses the **Iijoki.**
403	Crosses the **Vessioja.**
405½	Crosses the **Muhojoki.**
407	Crosses the **Vuornosjoki.**
408	**Olhava** halt. Line skirts coast.
409	Crosses the **Olhavanjoki.**
419	**Kuivaniemi.**
419½	Crosses the **Kuivajoki.**
425	Crosses the **Simojoki.**
427	**Simo.**
429½	Crosses the wide **Viantienjoki.**
442	**Kemi,** with line to harbour, 1 mile.
445	**Lautiosaari** halt.
	Line crosses the wide **Kemijoki** by bridge 1 mile long, the N. end of which consists of a single span of 520 ft.
446½	**Laurila,** near old Kemi.
	Branch NE. to **Rovaniemi**, 68 miles.

miles	
0	**Laurila.**
22	**Tervola.**
36½	**Koivu.**
43½	**Jaatila.**
52	**Muurola.**
67	**Rovaniemi.**
68	To river at confluence of the Ounasjoki with the Kemijoki.

448½	**Kaakamo** halt on the Kaakamajoki.
454½	Crosses inlet.
458	**Torneå** on l. bank of the Tornionjoki at mouth, facing town of Torneå on an island in river. Steam ferry to town. Swedish town of Haparanda opposite on r. bank. Railway bridge sanctioned July 1916. Through traffic crosses here.

ROUTE V

HAAPAMÄKI TO PIEKSÄMÄKI, NYSLOTT, AND ELISENVAARA (221 miles approx.)

miles.	
0	**Haapamäki.** Line runs E. among many lakes crossing the N. end of Keurusselkä, on which lies
10	**Keuruu.**
16	**Asunta** halt between lakes to N. and S.
21	**Huttula** halt.
26½	**Petäjävesi,** on lake of same name.
32	**Kintaus,** after skirting Huhtiajärvi.
41	**Vesanka** on S. of Vesankajärvi. Line turns SE. to
48½	**Jyväskylä** on Jyväsjärvi. Small town.
	Branch NNE. to **Suolahti,** 26½ miles.

miles	
0	**Jyväskylä.** Line runs NNE.
7	**Leppävesi** on lake of same name.
14½	**Laukaa** near N. end of Leppävesi.
18	Crosses **Kuusa** canal between Leppävesi and Vatiajärvi.
18½	**Kuusa.**
26½	**Suolahti,** on Lake Keitele.
	Branch to **Äänekoski.** 5½ miles (gauge, 2 ft. 5½ ins.)

Beyond this point to Pieksämäki the railway has recently been opened. The distances given are only approximate. Line continues E. round N. end of Paijänne.

51	**Haapakoski.** Line turns S. along W. of Leppävesi.
65	**Toivakka.** Line rounds S. end of Leppävesi and strikes ENE. through marshy country with many rivers to
85	**Hankasalmi,** at S. end of Kuuhankajärvi.
105	**Pieksämäki.** Line crosses railway Kouvola to Kajana, see Route II.

miles

124 **Huutokoski.**
Branch NE. to **Varkaus** on Haukivesi, 12 miles.
129 **Joroinen.** Lakes to N. of line.
147½ **Rantasalmi.** Haukivesi to N. of line which runs on isthmus to
170½ **Nyslott,** on straits between Haukivesi to N. and Pihlajavesi to S. Line runs E. by S. to
183 **Kulennoinen.** Thence line runs SE. alongside road
187 on natural embankment of **Punkaharju** and islands connected by bridges through Puruvesi to
191 **Punkasalmi** on Puruvesi.
195 **Putikko** on Puruvesi.
204½ **Särkisalmi** on Simpelejärvi. Crosses narrow strait and runs along lake to
207½ **Parikkala.**
213 **Syväoro.**
217 **Sorjo.**
221 **Elisenvaara** on line from Viborg to Nurmes (see Route III).

ROUTE VI

Åbo to Helsingfors (123½ miles)

0 **Åbo.** On leaving **Åbo** the line crosses the **Aurajoki.** Its general direction is E.
6 **Litoinen,** alt. 98 ft., with Litiostenjärvi to N.
11 **Piikkiö,** near the head of gulf.
Line crosses the **Pemarjoki,** just before
17 **Paimio.**
26 **Hajala.**
31½ **Halikko.**
32½ Crosses the **Halikonjoki.**
34½ **Salo,** at the head of a deep inlet. Line turns S.
37½ Alt. 92 ft.
43 Crosses the **Pernionjoki.**
45 **Perniö,** alt. 52 ft. Line turns SE.

miles	
52½	**Koski.** Leaving line crosses the **Kiskonjoki.**
54	Alt. 105 ft.
58	**Skogböle** halt.
64	**Skuru,** at the head of Pojoviken.
	Branch N. to **Fiskars,** iron foundry. 3½ miles (gauge 2 ft. 5½ ins.).
66½	Crosses the **Karisjoki.** Alt. 29 ft
67	**Billnäs.**
	The only tunnel in Finland is between here and
69½	**Karis,** alt. 98 ft. Line joins the Hangö–Riihimäki line, for which see Route VII.
72	The line turns E. leaving Hangö–Riihimäki line.
75	**Fagervik,** alt. 95 ft.
80	**Ingå.** Line runs NE.
83	**Täckter.**
87	**Solberg.**
91	**Sjundeå.** Line gradually turns SE. and passes Vikträsk.
93	Crosses the Sjundeå.
95½	**Käla** halt. Line now runs E.
99½	**Kyrkslätt.** Line turns NE. to
104½	**Masaby.**
108½	**Köklaks** near the head of Esboviken, with several small lakes to the left.
111	**Esbo.** The line runs E. again.
113½	**Grankulla.**
118½	**Sockenbacka,** alt. 69 ft. The line curves S.
121½	**Fredriksberg.** Here the line from Riihimäki to Helsingfors joins from the NE. See Route VIII. The track is now double.
	Branch SE. to harbour of **Sörnäs,** 2 miles.
122½	Crosses Gulf of Tölö by causeway 500 yds. long.
123½	**Helsingfors,** the capital of Finland, with excellent harbours.
	The railway runs right round the town by the
127	quays from W. to E. to **Skatudden** (Katajanokka).

ROUTE VII

Hangö to Riihimäki (99 miles)

miles	
0	**Hangö,** seaport open all winter; branch lines to harbour.
11	**Lappvik,** alt. 69 ft., on Hangö peninsula; branch line to wooden landing-stages. Line crosses **Pojoviken** by a long bridge just before reaching
21	**Ekenäs,** a small sea-port.
26	Alt. 154 ft.
31	**Karis,** alt. 98 ft. Junction with Helsingfors–Abo line, see Route VI.
40½	**Svartå,** alt. 226 ft., near S. end of Lohjanjärvi. Branch N. to **Lohjanjärvi** (narrow gauge), 4 miles.
42½	Alt. 200 ft.
45	**Gerknäs,** alt. 168 ft. Line runs along E. shore of Lohjanjärvi
53	**Lohja.** Branch SW. to Lohja village on lake, 3 miles, (gauge 2 ft. 5½ ins.).
54	Alt. 279 ft.
61	**Nummela,** near S. end of Enäjärvi.
69½	**Otalampi,** alt. 239 ft.
77½	**Korpi** halt, alt. 266 ft.
79½	**Röykkä.**
84	**Rajamäki,** alt. 233 ft.
92½	**Hyvinkää,** alt. 387 ft. Junction for Helsingfors. Branch W. to **Pyhäjärvi** (gauge 2 ft. 5½ in.), 28 miles.

miles	
0	**Hyvinkää.**
7	**Kytäjä.**
15	**Läyliäinen.**
18½	**Vaskjärvi,** alt. 340 ft. on lake of same name.
22½	**Hunsala.**
28	**Högfors** (Pyhäjärvi) on the Nuijajoki

miles

99 **Riihimäki** junction, alt. 308 ft. For lines to Åbo and Petrograd, see Route I; for line to Tammerfors, Torneå, see Route IV; for line to Helsingfors, see Route VIII.

ROUTE VIII

Helsingfors to Riihimäki (44 miles)

Double track.

0 **Helsingfors.** Branch line to wharves. Just outside the town the Gulf of Tölö is crossed by a causeway 500 yds. long.

2 **Fredriksberg.**

Branch from Åbo, see Route VI.

Branch SE. to **Sörnäs** harbour 2 miles.

4½ **Åggelby,** alt. 62 ft.

5½ Crosses the **Vandaå.**

6¾ **Malm.**

Branch to E. of village of Malm, 1 mile.

Crosses the **Kerävanjoki** just before reaching

10 **Dickursby,** alt. 20 ft.

14 **Korso.**

18 **Kerava.**

Branch E. to **Borgå,** 19 miles.

miles	
0	**Kerava.**
¾	Crosses the **Kerävanjoki.**
6	**Nickby,** alt. 59 ft.
11	**Andersböle.**
12	Crosses the **Mäntsalänjoki** or **Svartså.**
15	**Hindhår.**
20	**Borgå,** a timber port, at the mouth of the Borgaå. Road bridge crosses river to town.

23 **Järvenpää,** alt. 160 ft., at the head of Tuusulanjärvi. The line turns NW.

miles	
30½	**Jökela,** alt. 230 ft.
37½	**Hyvinkää,** alt. 387 ft.
	For line from Hangö, see Route VII.
	For branch to Pyhajärvi, see Route VI.
44	**Riihimäki,** alt. 308 ft.
	For line from Åbo and Petrograd, see Route I.
	For line to Tammerfors and Torneå, see Route IV.
	For line from Hangö, see Route VII.

GAZETTEER OF TOWNS

THE general poverty of the country has hindered the growth of large centres of population and the factors which now stimulate the growth of Finnish towns, the export of wood and the use of water-power for industrial purposes, have been of importance only in recent years. The difficulties which the rivers offer to navigation in their rapids and their winter ice never encouraged the growth of towns at their mouths, and while the lakes of the interior offer many nodal points on their water-ways, the productiveness of the lake plateau was always too poor to cause large numbers of people to collect in any one place, until the beginning of industry. The chief factor in the origin and growth of towns was the great facility for exchange between land and sea, afforded by the broken nature of the coast line and the many natural harbours. These features, however, could not lead to the collection of people in large centres until the population engaged in external trade, which did not happen until the Swedes took possession of Finland and developed its resources. Hence almost all the towns of Finland are of Swedish origin and many of them remain predominately Swedish to this day. In Chapter V it has been explained that the Swedish population of Finland is found chiefly in the coast towns. Even the Finnish towns are generally known by their Swedish names. The long extent of the coast line compared with the total area of the country, the many good harbours, and the uniformity in productiveness, low though it is, militates against any one port ousting others, and favours the existence of many small centres. All along the coast there are isolated loading places and saw-mills with no town or village in the vicinity.

The modern growth of the Finnish ports being largely based on the export of timber and its products, those that are not on a river or canal, which brings timber to the coast, make slow progress or even fall into decay, as in the case of Nådendal to the west of Åbo. On the other hand those towns well placed for timber export grow quickly. Kotka, in particular, has had a surprising growth. The use of water-power has stimulated the growth of some inland towns, but it seldom accounts for a new centre of dense population because of the great number of suitable rapids throughout the country.

Most of the towns are built of pine and spruce wood. In the past this was the sole material employed. Stone was either not available because of the thick covering of glacial deposits, or when procurable was generally granite and hard to work. It was therefore used only for fortresses and churches. The want of building material of a permanent nature has always resulted in a frequency of fires. There is scarcely a town in Finland that has not been burnt down more than once. This, of course, made it easy to move the town to a more favourable site, if the existing one had disadvantages, but it has resulted in few of the towns having buildings of any antiquity even if their sites have been long occupied. In many towns there are watch-towers with a man continually on the lookout for fire. It is only in recent years that stone has been used to any considerable extent in a few of the larger towns.

Villas and summer houses straggle along the lake or sea shores far beyond the confines of the town, and small steamers ply between the houses, pleasure grounds, and restaurants of the neighbouring islands and the towns.

As in most countries the towns of Finland grow in a haphazard and planless way, but Finland, in common with Britain and America, has witnessed in recent years a tardy growth of civic consciousness which in planning the growth of a town tries to foresee its future wants and considers the nature of its activities and the possibilities of the site.

Some of the places mentioned are little more than villages, but most rank as towns in Finland. Where the Finnish name

differs from the more generally used Swedish name it is given in brackets. A few inland towns have no Swedish names. Practically all the towns have telegraphic connexions (see Chapter X), and all have telephones. The dates of the opening and closing of the ports are given in Chapter II.

Åbo (Finn. *Turku*), lat. 60° 26′ N., long. 22° 14′ E., formerly the capital of Finland, now the second town. Pop. 53,000. On both banks of the Aurajoki, near its mouth; is approached from sea through tortuous channels of Åbo archipelago. Founded in 1157, oldest town in Finland; removed nearer sea to present site in thirteenth century; sacked and burnt on several occasions: ceded to Russia along with whole of Finland, 1809: ceased to be capital 1812, being too near Sweden and too far from Russia, but nevertheless is natural capital being situated in most fertile part of country and nearest of all ports to Baltic. Burnt again in 1827, and, on rebuilding, university removed to Helsingfors. The most Swedish of all the towns of Finland. Regularly built, chiefly of wood; wide streets; old stone cathedral: public buildings at considerable distances from one another to obviate risk from fire. Electric tramways, German-owned. Iron and engineering works, wood works, cotton mills, sugar refinery, tobacco manufactures, oil factory, cement works, &c. Ship-building yard, which has built several Russian destroyers. Vessels drawing 16–17 feet can reach wharfs in heart of town. Larger vessels use the 'canal bank harbour' at the right mouth of the river, where there are 22 ft. alongside quay, with warehouses and modern loading appliances for timber. Large repairs of all sorts: patent slips. Coal and oil in stock. Russian torpedo craft coal at Åbo. Proposed to create great free port like Copenhagen, and train ferry to Stockholm. Exports: timber, wood pulp, paper, hides and skins, eggs, matches, cranberries, &c. Imports: coal, cotton, sugar, tobacco, oil, machinery, metals, and manufactured goods. British Vice-Consul. Railways to Toijala for Torneå and for Petrograd, and line to Karis and Helsingfors via coast.

Branch line to canal bank harbour with many sidings. Telegraph to all parts of Finland. Telephone to low power naval wireless station on Utö Island. A wireless station of 400 miles range was to be erected at Abo in 1914 : further information is lacking.

No permanent defence works at Åbo (1915). Barracks at east of town. Castle near mouth of river is used as a military storehouse.

Björneborg, or Berneborg (Finn. *Pori*), lat. 61° 29′ N., long. 21° 48′ E., one of the principal seaports of Finland. Pop. 17,000. On left bank of Kokemäenjoki (Kumo) about three miles from its mouth. Below the town the river splits into several channels. Northern part of town on island of Storsand connected to mainland by floating bridge. Saw-mills, tanneries, canvas factories, cotton-mill, match factory, &c. Salmon plentiful in river. Vessels drawing over 8 ft. cannot reach the town wharfs. An outer harbour has been constructed at **Mäntyluoto,** 12½ miles NW. of the town : artificial harbour with pier, 315 yards long and stone quays 425 yards long with large warehouses ; vessels drawing 20 ft. lie alongside. Patent slip and repairing facilities at Björneborg. At **Räfso** Island, 3 miles NW. of Mäntyluoto, are quays with 14 ft. alongside and anchorage in 21 ft. Björneborg exports wood, paper, hides, and oats, and imports cotton, sugar, machinery, &c. British Vice-Consul. Björneborg has had to face many difficulties since its foundation in 1558. It has been several times destroyed by fire, the last time in 1852, and as a port is inconvenient and adversely affected by development of Raumo. Railway connexion with general system at Tammerfors : line extends to Mäntyluoto and runs on to quays.

Borgå (Finn. *Porvoo*), lat. 60° 24′ N., long. 25° 41′ E., near the mouth of the Borgåå. Pop. 5,500. One of oldest towns in Finland with narrow winding streets. Founded in fourteenth century ; burnt by Russians in 1571 and since partially destroyed by fire several times. Here the Estates took the oath of fealty to Alexander I in 1809 and received his promises

in return (see p. 80). Cathedral dates from 1418. Wharf for steamers drawing 8 ft. on left bank; depth being dredged to 10 ft. Railway station for Helsingfors on right bank. Road bridge. River unnavigable above town and communication with interior bad. Engineering works. Linen and sail-cloth factory. Exports: timber, deals, battens, wood pulp. Most timber vessels have to load at mouth of river. British Consular Agent.

Brahestad (Finn. *Raahe*), lat. 64° 41′ N., long. 24° 29′ E. Pop. 3,600. Small seaport with several good harbours. Vessels drawing not over 6 ft. can reach the town and make fast to the pier, but larger vessels (18 to 19 ft. draught) can lie alongside mole in outer or **Lapaluoto** harbour. This harbour is being dredged to 22 ft. Railway from Lappi on main north line to Brahestad, with extension to Maivapera harbour (2½ miles), and 1½ miles farther south to Lapaluoto pier; also short branch to town pier.

Ekenäs (Finn. *Tammisaari*), seaport on Pojoviken east of Hangö peninsula. Pop. 2,800. Founded in 1528. Accessible to vessels drawing 14 ft. Batteries destroyed in 1854 by H.M.S. *Hecla* and *Arrogant*, and not since rebuilt. Railway station. Rail and road bridges over. Telephone cable to island of Stor Jussarö: small harbour. Barracks erected in 1911; small garrison. Naval harbour and barracks at **Tvärminnie** Island, 15 miles to south of Ekenäs near open sea.

Forssa, inland town of new growth on the Loimaanjoki. Pop. 7,000. Cotton mill. Narrow-gauge railway from Humppila on Åbo-Petrograd line.

Fredrikshamn (Finn. *Hamina*), lat. 60° 34′ N., long. 27° 13′ E. Pop. 3,400. Small seaport near the head of inlet on isthmus between inlet and Pampyölinjärvi. Founded in 1723 in attempt by Finland to take trade of Viborg, after Peace of Nystad had ceded Viborg to Russia (see p. 79). Taken by Russians 1742, three years after which Lovisa (q.v.) was founded with similar object. Fortifications pulled down as useless in 1836, as Viborg had taken its place as frontier fortress. No military importance since union of Russia and

Finland. Burnt in 1887 and rebuilt. Vessels drawing not over 16 ft. can reach town. Trade small and dwindling; deals, battens, pit-props. Railway connexion with line to harbour. Formerly a Russian garrison in building used as Finnish Military Cadets' College.

Gamlakarleby (Finn. *Kokkola*), lat. 63° 50′ N., long. 23° 8′ E. Pop. 4,100. Town on west bank of small stream flowing into head of Trulle Bay: not accessible except by vessels of light draught. Saw-mills, match factory, small engineering works. On main line of railway to north. Branch line west to port of **Ykspila**, 2½ miles, with three piers in 12 to 26 ft., with railway running on to them and several sidings. Harbour safe except in northerly winds. Exports chiefly planks, pit-props, and wood-pulp. In June 1854 a small detachment of British sailors and marines attacked Gamlakarleby and was defeated. British Vice-Consul.

Hangö (Finn. *Hanko*), lat. 59° 49′ N., long. 22° 57′ E. Large seaport of modern origin (1874), although the harbour has been used from the Middle Ages. Pop. 7,000. Generally open throughout the winter. On sandy peninsula stretching 19 miles to sea. Eastern and western harbours separated from each other by range of granite hills one mile long called Drotningsberg. Western harbour deepest, largest and best protected: quays, warehouses, and railway siding: 30 ft. of water alongside. Whole harbour was destroyed by the Russians on the outbreak of war to prevent its being used for the disembarkation of German troops: now again in use. Exports wood, paper, tar, butter, and game. Telephone cable to Utö Island. Wireless station. British Vice-Consul. Coaling station for Russian torpedo boats: no modern defences.

Heinola, small inland town mainly on north bank of Kyminjoki, not far from south-east end of Päijänne. Pop. 1,700. Water communications, but not to coast. Road bridge. No railway, but a line to Lahti has been projected.

Helsingfors (Finn. *Helsinki*), lat. 60° 10′ N., long. 24° 57′ E., capital and principal seaport of Finland, lies at end of peninsula projecting southward to Gulf of Finland. Founded in 1550 by

Swedes 3 miles from its present site, to which it was moved in 1621; burnt several times and devastated by plague: last burnt in 1808; made capital in 1812 (see Åbo), university transferred from Åbo 1827, became largest town in Finland 1830. Pop. 167,000. For productions and trade the site has less value than that of Åbo, and the hinterland is not as fertile, but there is better water-frontage and room to expand. Largely built of granite: much fine architecture of unique character, and well-planned, wide streets; electric tramways. Many industries, including saw-mills, joinery works, engineering works, sugar refining. Manufactures of nails, tobacco, porcelain, electric cables and wires, &c. Shipbuilding yards, which occasionally build destroyers for Russia. Exports: timber, ships, boats, paper, pulp and wood manufactures. Imports: manufactured goods, sugar, coal, oil, &c. Chief harbour on eastern side of town with quays accessible to vessels of 24-ft. draught: most of the quays have railway connexion. It is proposed to improve Sandvik harbour on west of town. Repair facilities of all sorts: patent slip: dry dock 300 ft. long. Large stocks of coal and oil. British Consul. Railway north to Petrograd and other parts of Finland, and coast line west to Hangö and Åbo. Connected with general telegraph system of Finland: direct military line to Petrograd. Naval wireless station on Sandhamnö Island and a low-power station in Brunn's Park at the south side of the town. Submarine cable to Sveaborg; exact landing-place unknown: also cable connecting Sveaborg with town to barracks in Elizabetagaten. Cable from Sveaborg to Reval. Helsingfors has naval and military defences, but none on the land side. There is a large garrison in several barracks in the town and on the islands comprised in the fortress of Sveaborg. Naval harbour on eastern side of Skatudden Island. Land entrance at NW. corner by bridge across narrow strait. Coaling jetty built out into deep water: repairing facilities small: floating dock slip: store of Welsh coal. Excellent sheltered anchorage in the roads for largest squadrons. Military defences known collectively as fortress of Sveaborg, which is a second-class

fortress. In 1909 decided to make it first-class fortress, constructing forts farther out to sea, including islands of Degerö and Stora-Miölö.

Iisalmi or Idensalmi, inland town on Porovesi dating from 1891. Pop. 2,200. Town lies on both sides of outlet from Paloisjärvi to Porovesi. Two road bridges and a railway bridge of line from Kouvola to Kajana: branch from north side of river to harbour. Proposed to continue railway west to Ylivieska on Torneå line. Centre of water-routes. Saw mill: flour-mill.

Jakobstad or Yakobstad (Finn. *Pietsarsaari*), lat. 63° 40′ N. long. 22° 42′ E. Pop. 6,700. Seaport on west side of a northward projecting peninsula. Town is at the head of Alholmen bay and port at mouth. Railway connexion from port of **Alholmen** through town, 2½ miles off. Vessels drawing 18 to 20 ft. can make fast to Alholmen quays. Town piers have 14 ft. alongside. Exports wood and other forest products, butter and hides. Saw-mills, mechanical shops, sugar refinery, tobacco manufactures.

Joensuu, new inland town (1848) on Pyhäselkä at mouth of Pielisjoki. Pop. 4,700. Water communications to south and north. On railway from Nurmes to Viborg. Railway station opposite town: road bridge between. Railway bridge east of town. Saw-mills, paper and pulp mills.

Jyväskylä, town of recent origin (1837) on Jyväsjärvi, connected with the northern end of Päijänne. Pop. 3,800. Terminus of waterways and focus of railways. Manufactures of paper and leather; saw-mills. Wharves.

Kajana (Finn. *Kajaani*), an inland town on the south of the Kajaaninjoki canalized in its course past town; two locks. Pop. 3,000. Founded by Swedes in seventeenth century as trading centre. Lies near northern limit of the most valuable timber forests. Flour-mills; woodwork; centre of tar industry. Terminus of railway from Kuopio and Kouvola, with extension (2 miles) to Oulujärvi and 2 miles to Naasjärvi. Roads to Uleåborg and to Nurmes.

Karunki, a frontier village 13 miles north of Torneå. On

opposite side of Tornionjoki, 2 miles distant, is Swedish Karunki on railway. No bridge between.

Kaskö (Finn. *Kaskinen*), lat. 62° 23′ N., long. 21° 13′ E. Small sheltered seaport on Kaskö Island which is connected with mainland by short road and railway bridges. Pop. 1,100. Approach difficult; two small quays for vessels of 21 and 12 ft. respectively: larger ones under construction. Anchorage in 30 ft. Small timber trade.

Kemi, a modern seaport dating from 1869, with open harbour at mouth of the Kemijoki on a peninsula on the left of estuary. Lat. 65° 44′ N., long. 24° 33′ E. Pop. 2,000. Originating in the Kemijoki providing a route by which timber can easily be floated from interior. Harbour exposed: vessels drawing up to 11 ft. lie alongside railway pier; 13 ft. at quays. Branch railway to wharf round north of town from main line on east of town. Exports timber of various kinds. Timber vessels load in inner or outer roads. Large quantity of fish caught in river mouth. Old Kemi lies near mouth of Kemijoki on right bank, 6 miles farther north. Railway bridge over Kemijoki largest in Finland: five arches, of which two are 200 ft. each and one over 400 ft. British Vice-Consul.

Kexholm or **Keksholm** (Finn. *Käkisalmi*). Pop. 1,800. Port on west of Lake Ladoga at mouth of Vuoksi, now silted up. Formerly a Karelian fortress. Railway from Hiitola on Viborg–Nurmes line. Salmon fishing. Half population Russian.

Kotka, lat. 60° 28′ N., long. 26° 57′ E., lies to the east of the mouth of the Kyminjoki on an island and the opposite peninsula. Pop. 11,000. Founded in 1879; one of the most rapidly growing towns in Finland owing to unique position for trade of east Nyland, and excellence of harbour. Harbour lies north of Kotka Island, sheltered from all winds and with depths of 20 to 120 ft. Vessels drawing up to 14 ft. lie alongside in town harbour. Another good sheltered harbour on west side of Kotka Island with 5 to 6 fathoms; depth at quay 18 ft. Water from Kyminjoki fresh enough for drinking. In 1911

plans adopted for new harbour works at cost of £134,000; wharves on NE. side of island, 281 yds. in 23¾ ft. on both sides and 87½ yds. in 15¾ ft. Work temporarily stopped by Government in autumn 1912. Railway connexion with lines to wharves. Rail and road bridges to island. Submarine cable to Haapsaari (Apsö). Chief centre of timber trade in Gulf of Finland: eight saw-mills. Exports sawn timber, wood pulp, paper and pasteboard. In 1913, 650 steamers and 379 sailing vessels entered the port, mainly Finnish and German. Attacked in 1854 by French and British fleets and fortifications demolished. Old fort still commands road to mainland. No garrison. British Vice-Consul.

Kristinestad (Finn. *Kristiinankaupunki*), lat. 62° 16′ N., long. 21° 23′ E. Pop. 3,300. Important seaport with large trade in timber of all sorts. Town lies on a peninsula on west of a long fjord at its narrowest part, connected by a road bridge ¼ mile long with railway station and wharves on east side. Vessels drawing 19 ft. can reach the port. Ship-building yard. British Vice-Consul.

Kuopio, inland town on peninsula in Kallavesi. Pop. 17,000 Founded 1776; now second inland town in size and importance; through communication by lake and canal with Viborg. On railway from Kouvola to Kajana; short branch to harbour. Manufactures of bobbins, matches; flour-mills; saw-mills. Centre of horse-breeding district.

Lahti, new town at south end of Vesijärvi originating as railway junction. Pop. 6,000. Port for southern end of Päijänne navigation: narrow-gauge branch railway lines to lake. Saw-mills and pulp-mills; bobbin factory. Barracks.

Lovisa (Finn. *Loviisa*), lat. 60° 27′ N., long. 26° 15′ E. Pop. 3,200. Seaport at north-east end of Lovisaviken. Founded in 1745 as Degerby to capture trade from Russia, but union of Russia and Finland destroyed its importance (see under Fredrikshamn). Depth at pier 9 ft., but most vessels load at **Valkom,** 4 miles south along shore of bay; many railway sidings on wharves; 24 ft. alongside wharves at Valkom. Narrow-gauge railway to Lahti from Lovisa and Valkom.

Small exports of timber. Fortifications in ruins. Bathing resort. British Vice-Consul.

Mariehamn (Finn. *Maarianhamina*), capital of Aland Islands (see Chapter XI). Pop. 1,200. Wooden jetty with 40 ft. of water. Seaport trading mainly with Sweden: exports sheep and butter. Telegraph to Sweden and Finland (see Chapter X).

Nådendal (Finn. *Naantali*), 7 miles west of Åbo. Dates from fourteenth century; once had great reputation: now falling into decay. Pop. 900. Saw-mills. Bathing resort. No railway.

Nikolaistad (Finn. *Nikolainkaupunki*), generally known to Finns as Vasa, lat. 63° 6′ N., long. 21° 37′ E. Pop. 24,000. Large seaport, originally built by Swedes in 1611 three miles farther to south-east as **Vasa** (Finn. *Vaasa*), destroyed by fire in 1852 and rebuilt on present site on the north of the estuary of the Laihianjoki opposite Vasklot Island. Saw-mills, flour-mills, sugar refinery, cotton-mill, iron and steel works, lace factory, &c. Exports: wood in various forms, tar, cattle, grain, &c. Imports: coal, cotton, sugar, and manufactured goods. Excellent harbours sheltered from all winds. Best harbour is on west of Vasklot Island, where are two piers with 21 ft. alongside, and a quay with 15 ft. The town quays have 12 to 15 ft. alongside. Facilities for small repairs. Railway to Seinäjoki on main line to north, and line to Vasklot by road and railway embankment and bridge; branches to all wharves. Also road bridge over Metviken to Brändö peninsula. British Vice-Consul.

Nurmes, small inland town at north end of Pielisjärvi on neck of land between Pielisjärvi and Lautiaisjärvi. Pop. 500. Water communication to south. Road to Kajana. Terminus of railway line from Viborg.

Nykarleby (Finn. *Uusikaarlepyy*), lat. 63° 31′ N., long. 22° 32′ E. Small town on east side of Lappo river dating from seventeenth century. Pop. 1,250. River narrow in town and has rapids. Narrow-gauge line to Kovjoki, 5 miles, on main line to north, with extension 2 miles to west over river to

port of **Marielund** and on to pier in 7 ft. Jetties north of pier, and others at Bonäs, three miles south. Good road from Nykarleby to Marielund. Exports chiefly pit-props and wood pulp.

Nyslott (Finn. *Savonlinna*), old inland town originating on island in strait of Kyrönsalmi between Haukivesi and Pihlajavesi. Pop. 3,500. Town grown to other islands and to mainland on opposite sides of strait. Road bridge to mainland on west. Railway, crossing both straits on bridges, from east, now goes west to Pieksämäki and Jyväskylä. Saw-mills, engineering workshops. Russian garrison maintained in old castle of Olafsborg till 1859.

Nystad (Finn. *Uusikaupunki*), formerly called Kalainen, lat. 60° 48′ N., long. 21° 25′ E. Pop. 4,500. A small seaport without railway connexion, but narrow-gauge line is proposed to Humppila on Åbo-Toijala line. Road to east branching to north and south. Cables to Grisslehamn and to Åland Islands. Saw-mills, shipbuilding yard, repair shops, foundry, and patent slip. Harbour 4 to 6 fathoms ; at saw-mill wharf 16 to 17 ft.

Pietari, Finnish name for Petrograd.

Raumo (Finn. *Rauma*), lat. 61° 8′ N., long. 21° 30′ E. Pop. 6,000. Old seaport founded in Middle Ages. Railway runs through town to pier (16 to 20 ft.) on island to the west, about one mile, and branch crosses to island of Korkeakari on north side of harbour. Since railway was built Raumo is growing at the expense of Björneborg. Saw-mill and shoe factory. Exports timber. British Vice-Consul.

Riihimäki junction for Helsingfors on Åbo–Petrograd line. Pop. 4,000. Saw-mills. Garrison.

St. Michel (Finn. *Mikkeli*), inland town on north-east of Lake Saima. Pop. 4,500. Water and railway connexions; wharves, saw-mills, tanneries.

Sortavala or Sordavala (Russ. *Serdovol*). Port on north end of Lake Ladoga. Pop. 3,200. Harbour in heart of town with sidings to railway which passes through town. Saw-mills, granite quarrying.

Systerbäck (Finn. *Rajajoki*, Russ. *Sestroryetsk*), lat. 60° 6′

N., long. 29° 58′ E., a small town on Lake Sestroryetsk on the Russian side of the Finno-Russian frontier near the Gulf of Finland, about one mile inland. Government small arms factory, barracks. One mile to north, on sea-coast, fashionable seaside resort. Railway along coast to Petrograd and line to Valkeasaari. Systerbäck was ceded to Russia by a readjustment of the boundary in 1864.

Tammerfors (Finn. *Tampere*), the largest inland town in Finland, on both sides of Tammerkoski, stream which connects Näsijärvi with Pyhäjärvi. Pop. 47,000. Founded by Swedes in 1775 on site of old trading place; industrial development began in 1821 by efforts of Scotsman named Finlayson, assisted by special privileges which allowed town from 1821 to 1905 to import duty free all raw material and machinery required. Cotton and some woollen manufactures. Also paper, nails, and woodwork. Railway locomotives. Saw-mills. Now third town in Finland. Focus of water-routes; railway connexions. Railway bridge and two road bridges over Tammerkoski. Cotton and paper factories (see Chapter VII). Stone replacing wood in building. British Vice-Consul.

Tavastehus (Finn. *Hämeenlinna*), on the Vanajavesi, in province of Tavastehus. Pop. 6,500. Founded in seventeenth century, destroyed by fire in 1851, but rebuilt. Town on west side of river connected by road bridge with railway on east. On main railway to north. No branch lines to river and no shipping facilities. Only of small commercial importance; saw-mills, bobbin factory.

Torneå (Finn. *Tornio*), lat. 65° 51′ N., long. 24° 9′ E. Frontier town; lies on island two miles above mouth of Tornionjoki. Pop. 1,700 before the war, but probably now increased. Separated by creek of river from town of Haparanda on Swedish bank; foot-bridge in poor repair between the two towns. Finnish railway reaches left bank of Tornionjoki opposite town; no bridge to town, but a steam ferry: sledge in winter. Bridge between Finnish and Swedish railways sanctioned by Sweden and Russia, July 15, 1916, now under construction. Only vessels drawing 4 ft. or less can reach

town wharf. Large vessels lie at **Röytta**, 5½ miles south of town, and load from lighters. Exports: timber and salmon. Visited by Lapps in winter who trade in skins, reindeer tongues, and fish. It is reported that barracks are to be built at Torneå and a large garrison maintained (1916). British Vice-Consul.

Uleåborg (Finn. *Oulu*), lat. 65° 1′ N., long. 25° 29′ E., one of the principal seaports of Finland, at mouth of the Oulunjoki on left bank. Pop. 21,000. Founded in 1605 on site of old trading place; destroyed by British fleet in 1854. Saw-mills, tannery, ship-building yard. Exports: timber of all kinds, tar, leather, fish, &c. Imports: coal and manufactured goods. In the tar store there are at times 70,000 barrels of tar. Depths alongside quay 16 to 18 ft., on Toppila Sound to north of town on right bank of river behind island of Huvila-alueita. River steamers to and from Muhos use quay two miles higher up, owing to rapids abreast of town. On main railway line to north with branch to quays. Railway bridge over Oulunjoki, and road bridge nearer mouth (1916). British Vice-Consul.

Viborg (Finn. *Viipuri*), lat. 60° 43′ N., long. 28° 44′ E., most easterly seaport of Finland near the head of large gulf. Pop. 29,000. Dates from 14th century or earlier; acquired by Russia earlier than other ports of Finland and developed as fortress rather than port; till 1860 was third town in Finland, when it was reduced to fourth place by Tammerfors. Town has spread to island of Mon Repos lying in gulf and linked to mainland in east by Åbo bridge (wheeled traffic) with movable portion allowing vessels up to 24 ft. beam to pass. Railway also crosses by an iron swing-bridge. Mon Repos Island joined to west side of gulf by road and railway bridge. Vessels drawing 13½ ft. can lie alongside quays; larger vessels lie at **Trångsund**, lower down the gulf, which has post office, shops, smithy, &c. Railway connexion to wharves. Several manufactures, including matches, woodwork, machinery, soap, tobacco, and small shipbuilding works. Small repair shops; patent slip. Electric tramways built by German firm. Trade

from interior via Saima canal reaches Viborg. Exports: timber of various kinds, wood-pulp and paper. Imports: coal, food products and manufactured goods. On main railway line to Helsingfors and Åbo (single), to Petrograd (double), and railway to Nurmes. Wireless station on the site of the old castle, available only to vessels in distress; also one at Trångsund. **Koivisto** (Swed. *Björkö*), on the east of the gulf near its mouth behind Koivisto Island, is the naval coal store with a pier with 17 ft. depth alongside. The port of Koivisto is connected by rail with Terijoki. A line is being built to Viborg via Kuolemajärvi. British Vice-Consul at Viborg.

Viborg has always been a fortified place from the days when it was in dispute between Sweden and Russia till now, when it is part of the defences of Petrograd. In late years the defences have been reconstructed on modern principles, and Viborg ranks now (1914) as a third-class fortress. The port itself would be useful for the disembarkation of troops, and the coast in the vicinity offers certain facilities.

Villmanstrand (Finn. *Lappeenranta*), lake port on south of Lake Saima. Pop. 3,000. Railway from Simola on main line with branch to Kaukas on lake Garrison housed in seventeenth-century fortress. Manufactures of paper, bobbins, corks. Saw-mills.

APPENDIX

MONEY, WEIGHTS, MEASURES, TIME, MAGNETIC VARIATION

Money

The standard of money is the *markka* (plural, *markkaa*), the equivalent of the French franc. The *markka* is divided into 100 *penniä* (singular, *penni*). The average rate of exchange is 25 *markkaa*, 22 *penniä* to the £1.

Bronze coins are 1 *penni*, 5 and 10 *penniä*; silver coins are 25 and 50 *penniä*, 1 *markka* and 2 *markkaa*; gold coins are 10 and 20 *markkaa*.

There are Bank of Finland notes for 1, 3, 5, 10, 20, 50, 100, 500, and 1000 *markkaa*.

Russian money is legal tender throughout Finland. The Russian unit is the *rouble* divided into 100 *kopeks*. A *rouble* is worth about 2·66 *markkaa* or 2*s*. 1*d*. and a *kopek* $\frac{1}{4}d$.

100 Finnish *penniä* = 37$\frac{1}{2}$ *kopeks* = 10*d*. = 1 franc.

Weights and Measures

The metric system has been used since 1890. The Russian measurements are given for reference as they are occasionally used.

Measures of length

1 *vershok* = 1·75 in. = 4·44 cm.

16 *vershok* = 1 *arshin* = 2 ft. 4 in. = ·71 m.

3 *arshin* = 1 *sazhen* = 7 ft. = 2·13 m.

500 *sazhen* = 1 *verst* = 3,500 ft. = ·663 miles = 1·0668 km.

A *sazhen* used as a measure of depth = 1 fathom = 6 feet. The English foot is a legal measurement in Russia, and is divided into 12 *dyuim*.

A statute mile = 1·508 *versts*.

A Finnish *verst*, which is seldom used, is slightly longer than a Russian *verst* and equals 1·0688 km. or ·664 miles.

Measures of area

1 sq. *sazhen* = 5·44 sq. yards = 49 sq. ft. = 4·54 sq. metres.

2,400 sq. *sazhen* = 1 *desyatin* = 117,600 sq. ft. = 2·7 acres = 1·09 hectares.

250,000 sq. *sazhen* = 1 sq. *verst* = 281·2 acres = ·44 sq. mile = 113·80 hectares.

An acre = 888·98 sq. *sazhen*.

Measures of weight

1 *dolya* = ·68 grains = 4·44 centigrams.
96 *dolya* = 1 *zolotnik* = ·15 oz. = 4·26 grams.
3 *zolotnik* = 1 *lot* = ·45 oz. = 12·79 grams.
32 *lot* = 1 *funt* = ·90 lb. = ·409 kilogr.
40 *funt* = 1 *pud* = 36·11 lbs. = 16·38 kilogr.
10 *pud* = 1 *berkovets* = 3·22 cwt. = 163·80 kilogr.
1 lb. = 1·107 *funt*.
1 ton = 62·02 *pud*.

Measures of capacity

1 *garnets* = 2·88 gallons = 3·279 litres.
1 *chetverik* = 8 *garnets*.
1 *chetvert* = 8 *chetverik* = 5·77 bushels = 2·09 hectolitres.
1 gallon = ·346 *garnets*.
1 bushel = 1·385 *chetverik*.
1 quarter = 11·08 *chetverik*.

Liquid measure

1 *charka* = ·216 *pint* = ·122 litre.
1 *shtof* = 10 *charka* = 1·08 quarts = 1·22 litres.
1 *vedro* = 100 *charka* = 2·7 gallons.
1 *bochka* = 40 *vedro* = 108·27 gallons.
1 pint = 4·61 *charka*.

Calendar

Finland in common with the rest of Europe, excepting Russia, uses the Gregorian calendar. Russia uses the Julian calendar, which is 13 days behind, but in February 1918 the Soviet Government issued a decree adopting the Gregorian calendar.

Time

In Finland Helsingfors mean time is used, which is 1 hour, 39 minutes, 49·1 seconds fast on Greenwich mean time, and 21 minutes, 29·5 seconds slow on Petrograd mean time, which is used in Russia.

Magnetic Variation

In 1917 the magnetic variation was about 1° W. at Torneå, 0° at Uleåborg, 3° W. at Nikolaistad, 4° W. at Mariehamn, 2° 30′ W. at Åbo, 1° W. at Helsingfors, 0° 30′ E. at Kotka, and 1° 30′ E. at Viborg. Variation was decreasing about 9′ annually.

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